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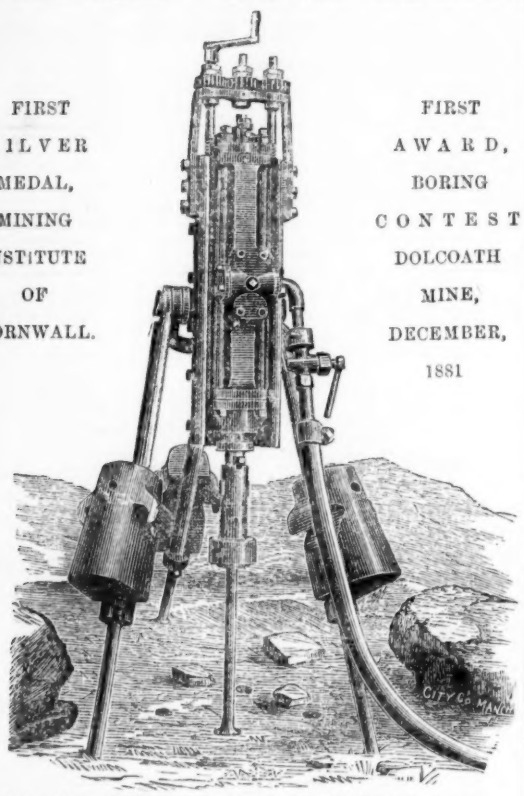

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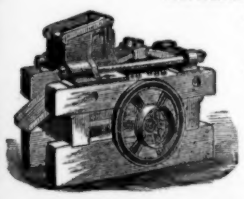

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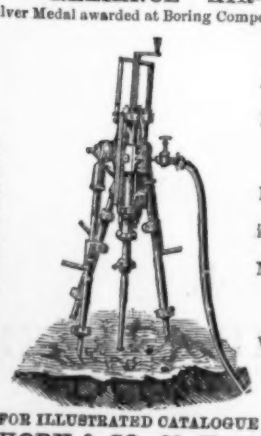

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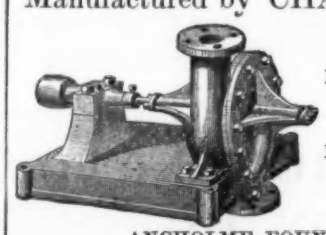

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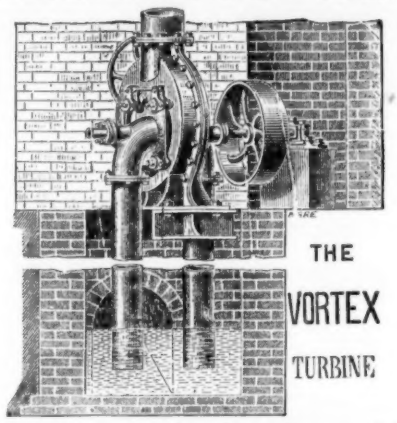

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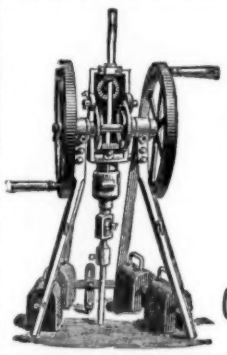

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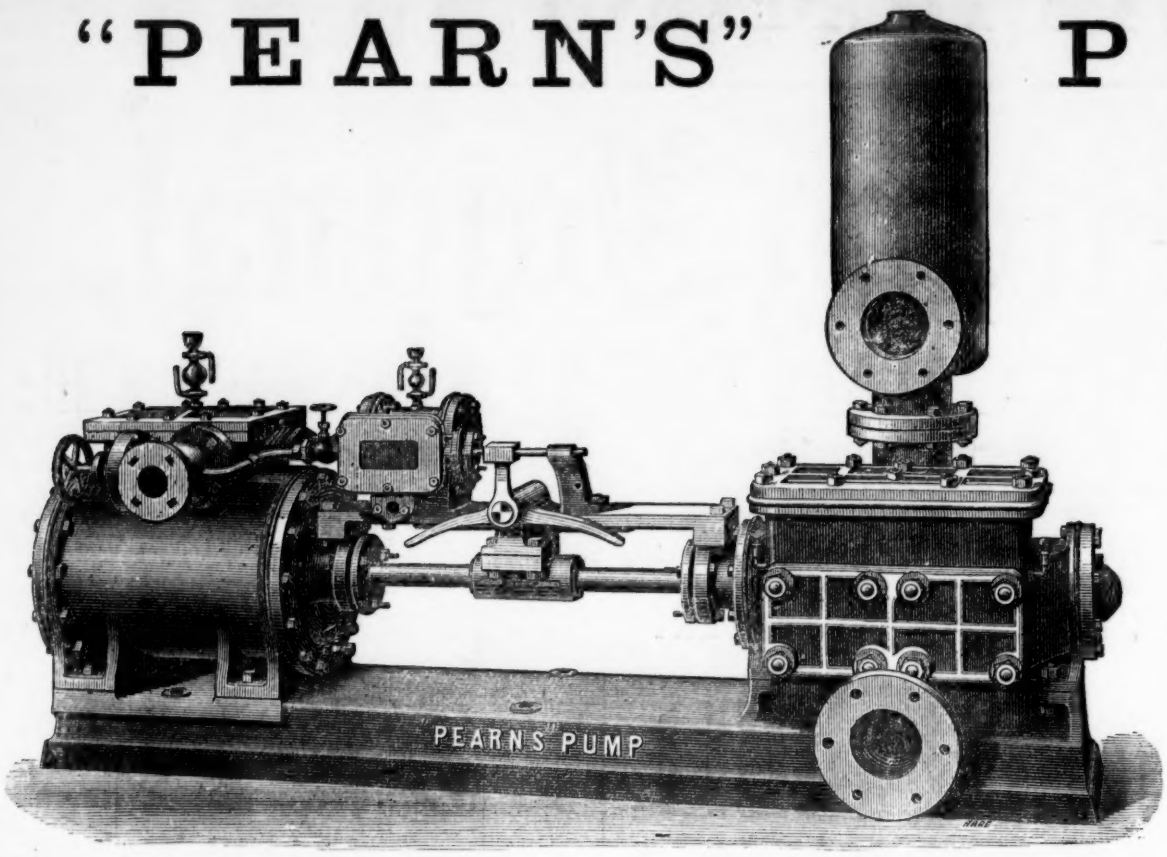

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Length of Stroke	9 in.	9 in.	9 in	9 in.	12 in.	12 in.	12 in.	12 in.	12 in.	18 in.	24 in.	24 in.	24 in.	24 in
Content, Gallons per Hour	950	1500	2160	2940	3840	4860	6000	8640	11590	15360	19440	24000	34650	46360
Price..... £	18	2[illegible]	24	28	35	38	45	60	70	85	130	140	180	230

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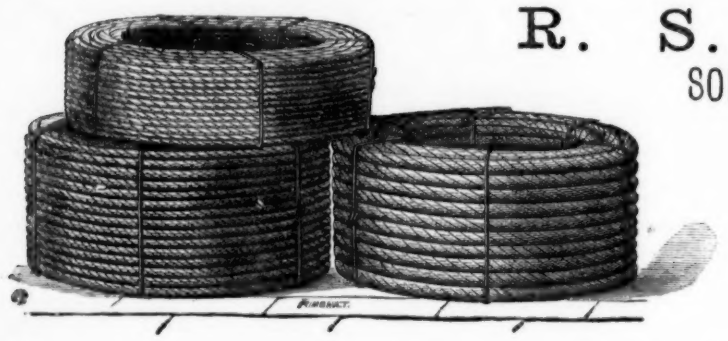

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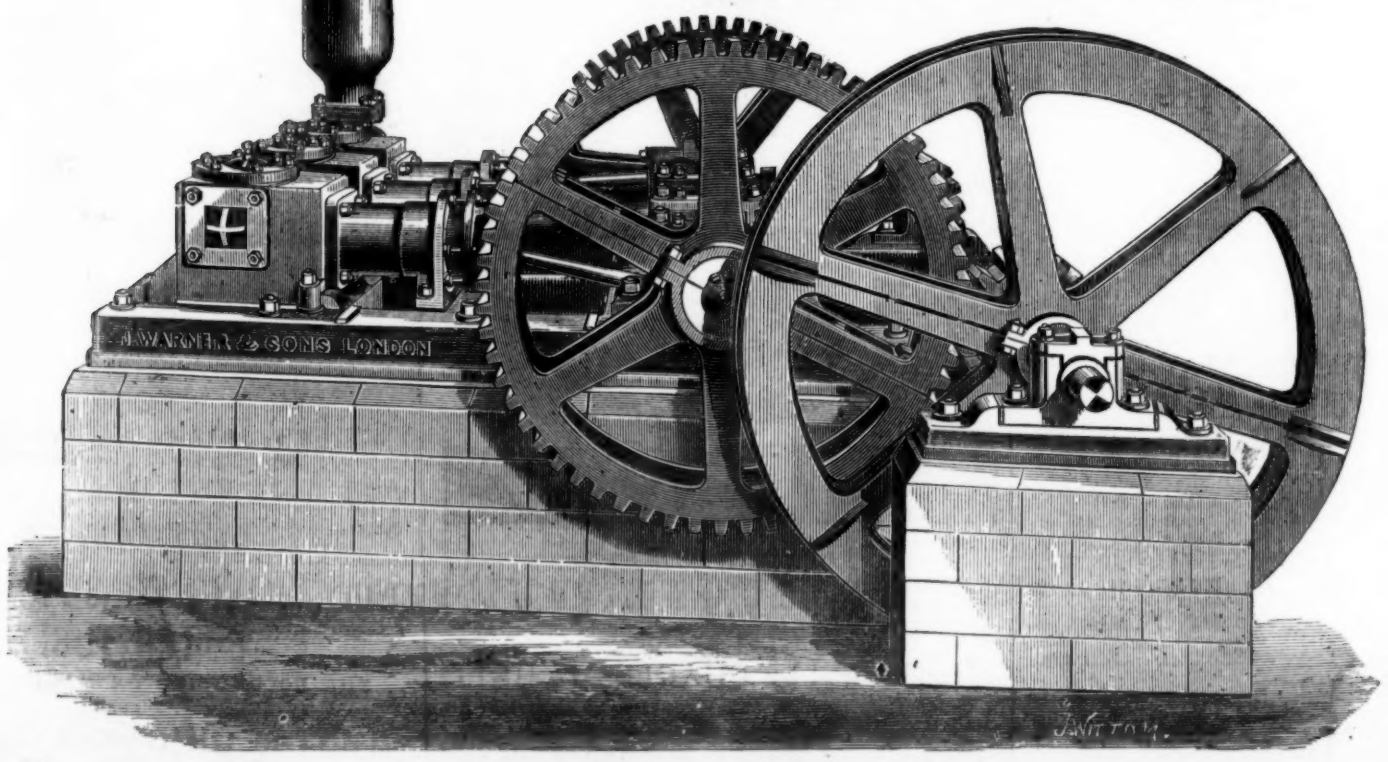

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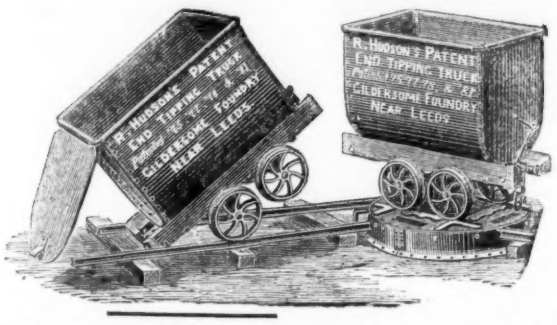
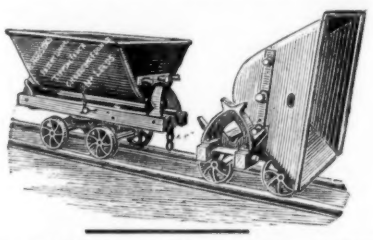
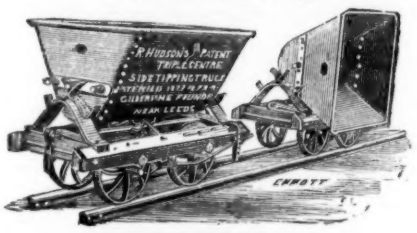


2. PATENT UNIVERSAL TRIPLE-CENTRE STEEL TIPPING TRUCK,
Will tip either SIDE or either END of rails.



One man can EASILY tip ANY WEIGHT in these wagons.

3.—PATENT TRIPLE-CENTRE STEEL SIDE TIP WAGONS.



4.—PATENT STEEL PLATFORM OR SUGAR CANE WAGON.

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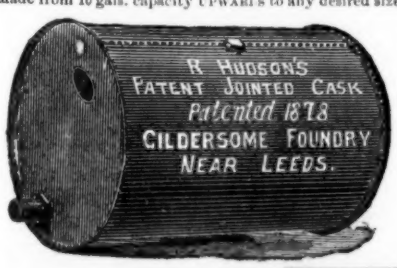
(As supplied to H.M. War Office for the late war in Egypt).
DOUBLE the STRENGTH of ordinary Casks without any INCREASE in weight.
(Made from 10 gals. capacity UPWARDS to any desired size.)



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NO BRICKWORK REQUIRED.
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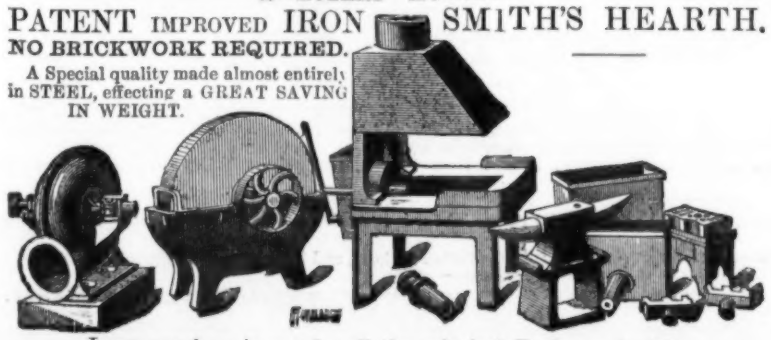
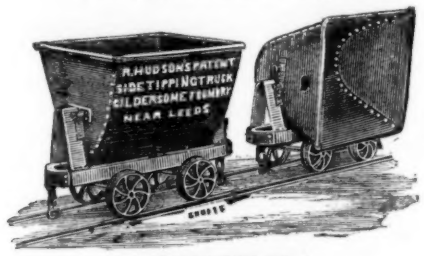
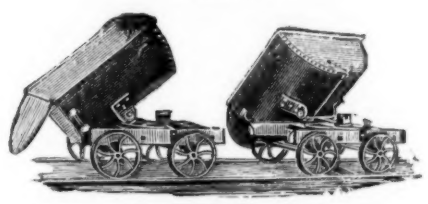


Large numbers in use by all the principal Engineers in this country and abroad.

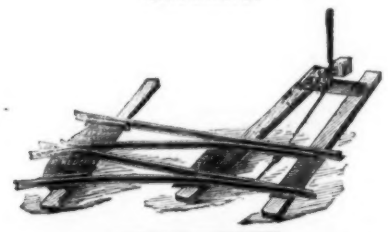
8.—PATENT DOUBLE-CENTRE STEEL SIDE TIP WAGONS,
Will tip either side of Wagons.



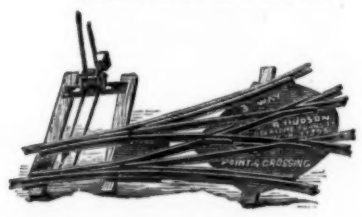
9.—PATENT STEEL ALL-ROUND TIP WAGON.



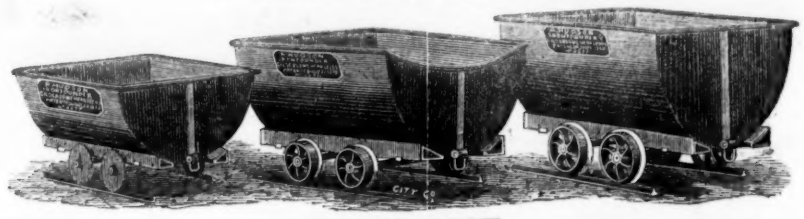
10.—LEFT-HAND STEEL POINT AND CROSSING.



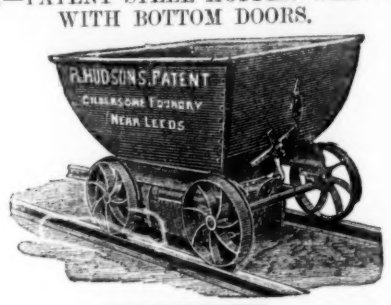
11.—RIGHT AND LEFT-HAND STEEL POINT AND CROSSING.



7.—PATENT STEEL MINING WAGONS.



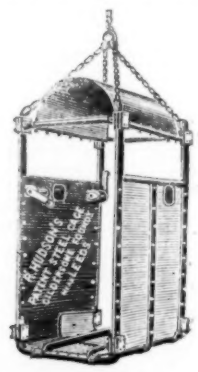
12.—PATENT STEEL HOPPER WAGON, WITH BOTTOM DOORS.



13.—PATENT STEEL HOPPER WAGON.

14.—SELF-RIGHTING STEEL TIP BUCKET.
(The "CATCH" can also be made SELF-ACTING if desired.)

15.—STEEL CAGE.



16.—PATENT STEEL WHEELBARROWS.
Made to any Size.
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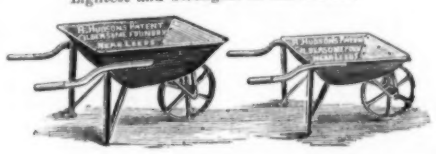

A great success.

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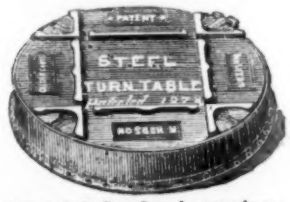

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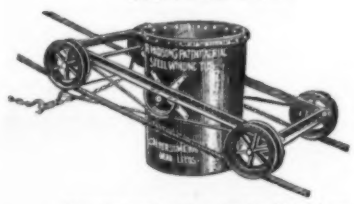

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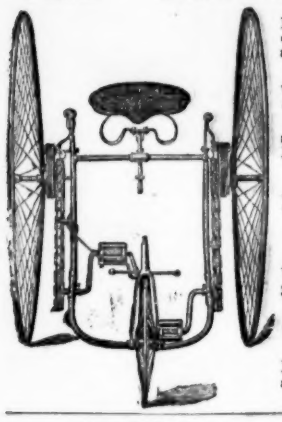

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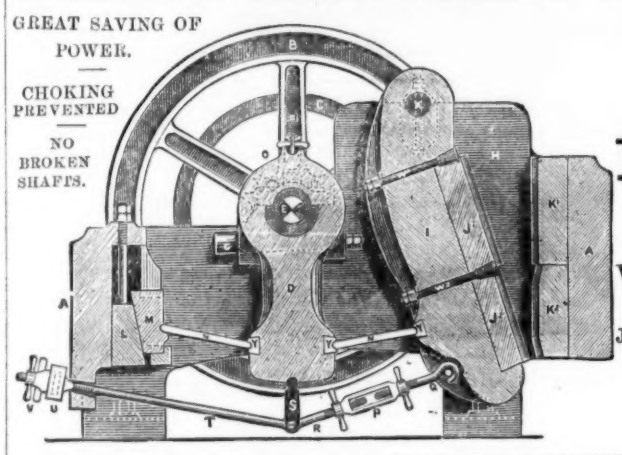

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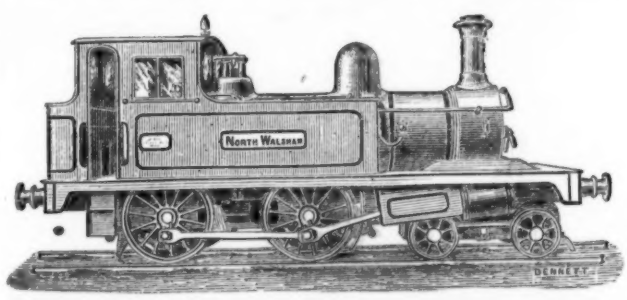

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AMERICAN MINING NEWS.

SIR,—It is gratifying to have to chronicle a tendency to a decidedly healthier tone in the mining market, and to report much activity in all the dividend stocks, while those of entirely a speculative character have received a fair amount of attention from speculators outside of the recognised dealers. Since my last report considerable interest has been excited in gold mining by a question which has arisen in the minds of several authorities on political economy as to the source of the future supply of the precious metal, which it is stated is far below the demand. The gradual falling off in the chief gold producing regions of the world, without corresponding discoveries, is becoming, it is alleged, a serious fact in the face of the circumstance of a universally regular increasing demand. It is perhaps for this reason that the announcement of any discovery of gold is warmly hailed, and that such a general disposition exists to embark in its development. This feeling is especially dominant towards the rapidly extending discoveries of gold in Dakota, particularly in the Deadwood district, in which the Cashier Gold Company has just secured a patent to work on the Cashier lode, which will be extensively opened on with, it is stated, reliable prospects of success. So far gold mining in Dakota has been of a steady quiet character, free of the unhealthy excitement which generally characterises the opening up of new fields, and a great incentive is given by the brilliant results of the Homestake Company, whose September dividend was 5000*l.*, the total dividends paid amounting to the enormous sum of 457,500*l.* These results show that with judgment in selecting properties, and with a careful and economical development of them, gold mining offers brilliant inducement to speculators.

The intelligence from the silver producing districts of Nevada, Utah, is very gratifying, and shows a gradually increasing yield in most of the leading mines. The dividend of the Crescent Company of Utah of 6000*l.* for the present month is just announced, payable at Salt Lake City on the 31st inst. The Ontario Company, also of Utah, has renewed dividends, the 88th amounting to 15,000*l.*, being declared payable in New York on the 25th inst. Colorado, however, seems to take the lead as a copper producing region, and obtains the greatest amount of attention. The splendid discoveries of the Rocky Mountain Company have created a great interest in the subject, and the impression seems general that when the smelting works of this company are in operation, pending which it is reported that enormous quantities of high produce ore are accumulating, a great impetus will be given to the development of a vast region teeming with mineral wealth of every description, while the Rocky Mountain stockholders are already congratulating each other on their brilliant future. The following statement of the value of bullion received by the various mining companies for the week ending Oct. 13, will give some idea of the producing power of the country and its relative position to nations:—Exports of gold and silver at New York for the week ending Oct. 13, $272,158; corresponding week of last year, $25,700. Imports, week ending Oct. 13, $7022; corresponding week of last year, $434,827. These figures speak for themselves.

New York, Oct. 24. ARGUS.

THE RICHES OF COLORADO—FAMOUS MINES OF SAN JUAN.

SIR,—The wonderful developments which have been made in the districts of Ouray, Red Mountain, and San Miguel during the present year, of which I made brief mention in a former letter, have been referred to at length by the mining editor of a Denver paper, and from his interesting article on the San Juan I have gathered the following important facts which will doubtless be of interest to readers of the *Mining Journal*:—"The construction of Mears' wagon roads, penetrating the most rugged and craggy portion of the Rocky Mountains, and richest mineral region of the San Juan to Red Mountain, Poughkeepsie, Mineral, and Sneffles, is nearly completed, and the herculean task of building the most difficult and costly mountain wagon road in the world is almost accomplished. It is a new era for Ouray, the mines and the mining camps. Where heretofore it has cost $10 to $14 per ton for packing ore to Ouray, it will now cost $2 to $3. This great reduction and benefit, brought about by the Mears' system of roads and iron rail tramways approaching the once impassable and inaccessible places in the mountains, will give an outlet and mode of transportation for the thousands of tons of ore now on the dumps, and will swell the bullion product to mammoth proportions, be a new incentive to mining and rapid development, and place Ouray where she will have just claim to the proud distinction of being the richest and most prosperous town in all the San Juan. The mines of Red Mountain, Mineral, Poughkeepsie, Sneffles, Virginius Basin, and Bear Creek, are all tributary to it, and many of them are now and have been all this season shipping their ore this way. But now, since the Mears' system of roads has reached the dumps far above timber line, and given them transportation facilities where it was considered impenetrable, the output and shipping from the different mines, embracing those that have shipped no ore as yet, will be increased to a wonderful extent. I will next mention the shipping and producing mines, also those with ore on the dumps ready for market, and those under fair development with good showing.

In Red Mountain district are the Yankee Girl and National Belle, the two most wonderful mines ever discovered in the State. The Yankee Girl alone has shipped over 4000 tons in the past 10 months. The lowest average has netted $125, and some shipments have run from $2000 to $4000 per ton. The National Belle is now shipping about 25 tons per day, averaging $80. These ores go to Denver *via* Silverton. But the low transportation offered by the Mears' system —$7 per ton laid down at Montrose—will bring the ores this way through Ouray for the Denver market. It will be a saving of about 50 per cent. In the same district are also the Orphan Boy, Robinson, Genessee, Champion, and Guston—known as the Yankee Girl group—all are shipping ores. The Guston is shipping 10 tons per day, this way averaging $70. Within this district are the American Girl, Congress, Senate, Humboldt, Ivanistan, Bobtail, Comet, Great West and McIntyre Mines; also the celebrated Jed Mine, the Pennsylvania, the Carbonate King, Sailor Boy, and Carbonate Queen properties; the Saratoga, Albany, Maud S., Belle of the West, Brooklyn, Bonanza King, H. A. W. Tabor, the Gaudaloupe, and Black Raven, the Galena Lion, Mountain King, and Sunshine. Some of these mines ship from 5 to 10 tons per day, averaging from $55 to $75. Many are undergoing development, and have large quantities of ore on the dumps awaiting shipment. A number show genuine lead carbonates; others have large bodies of galena and black oxide of copper and large quantities of grey copper, all running well in silver. The country rock is trachyte and granite. Mineral found in fissures and deposits. The summer of 1884 will show great development and a wonderful production.

In Imogene Basin of the Sneffles district, situated 5 miles by wagon road from Ouray, are the Yellow Rose, Agnes, Declaration, Hidden Treasure, Hancock, and Imogene. These have high grade gray copper, with galena, and run well in silver, and to a considerable extent carry gold. This group comprises the well-known Allied Mines, recently purchased by the Ouray Consolidated Mining Company, an English corporation. In Virginius Basin are the Terrible, Tornado, Bank of San Juan, Virginius, Monongahela, Blue Grass, Raleigh, Shamrock, and Spotted Tail. These exhibit galena and gray copper, with native and ruby silver. The mill runs from some of their claims are as high as 500 ozs. of silver to the ton, and 43 per cent. lead. In the Virginius the ore is galena and gray copper. It has sold $75,000 worth of ore.

In the San Miguel district, on the other side of the mountain from Virginius Basin, are the celebrated Sheridan, Smuggler, Mendota, Union, and Cimarron. The ore of these mines contains native and brittle silver, galena and gray copper, and are of a high grade and carry some gold. They have been shipping all the season by way of Telluride and Ouray to the Denver and Rio Grande at Montrose, but as soon as the Mears' roads reach over into Marshall Basin from Red Mountain, these mines, together with all the producing mines in this basin, such as the Argentine, Hidden Treasure, Cincinnati, Baby Elephant, Alamo, and many others will take this shorter route and lower rate of transportation and ship to Ouray exclusively, where concentrating and reduction works will most likely be built next season by Senator N. P. Hill.

During next summer the extension of the Denver and Rio Grande Railway will be completed from Montrose to Ouray, thereby enabling the mine owners to save at least $5 on every ton of ore shipped to the smelters at Denver and Pueblo, which in the aggregate will eventually amount to several thousand dollars a day.

Denver, Oct. 22. J. FITZ BRIND.

MINING NOTES—MEXICO.

SIR,—A recent writer on Mexico, Mr. Brocklehurst, says that "the mines of Mexico have produced $3,000,000,000 worth of silver—more than six-tenths of all the silver in circulation—and the amount obtained before the Conquest cannot be told. One-half the silver in use in the world has come from this locality. These mines are still producing 30,000,000 ozs. annually, and may soon double and treble the quantity, as the country gets settled railways become extended, and the process of extracting the ore conducted on new and scientific principles." These figures showing the total production of silver approximate those given in last week's *Mining Journal*, which may be accepted as the proper estimate. Of the future the opinion this writer gives agrees with that generally held by those who have an acquaintance with Mexico and the progress which is being made in developing its mineral resources. Everything is tending to an increased interest in Mexican mining, and before long we shall doubtless see a "boom" in this direction. There are but two or three British companies working mines in this centre of wealth. The British capitalist has turned his attention to every quarter of the globe. The results of mining in Australia, India, Africa, the Far West, and South America have not been so satisfactory as anticipated. For many years enterprise in Mexico has almost been at a standstill, and had it not been for the few old companies which have been hopefully plodding on under various vicissitudes it would have been completely dead. The United Mexican Company has been at work for about 60 years—the last of some half-dozen companies incorporated in or about 1824, and now success is nearly complete. It would, perhaps, surprise many to know that some of the shareholders here have held their interest for upwards of 10 years, and are at all times ready to increase their holding. The rage which obtained for Mexican mining 60 years ago was, perhaps, greater than anything which had gone before in the mining world, and this, too, where the knowledge of country was of the most limited nature. The total ignorance which prevails in respect to foreign mining enterprise leads many to expect returns ere any outlay has been made—the results are expected immediately. In all commercial undertakings a knowledge of the requirements, difficulties, and prospects are essential to success. With mines it appears to be different, investors often know little more about a mine than the name, and accept with the fullest confidence recommendations which are not genuine. Previous to Mr Ward's work on Mexico the British public knew nothing of the country, and yet they rushed into companies with an almost incredible haste. And because expectations were not realised at once the mines were abandoned as hopeless, the money invested lost, and succeeding capitalists reaping profits. But this impetuous manner of investing is not by any means confined to the country in question; in every mining centre the same thing has occurred. Even in England within the past few years this has happened, and in one instance at least positive fraud was resorted to, the public just as readily responding.

Mining operations cannot be carried out with the speed that some people imagine. Where a mine is in full operation and is taken over as a going concern then it is different. When mining investments were entered into in Mexico the only knowledge to hand was furnished by Humboldt, and the properties he named were those only which were believed would pay. The description of the immense wealth which they had produced carried the reader away. Past magnificence blinded the actual state of things; while no doubt they were only intended as illustrations of capacity. The properties named by Humboldt were those only at which the public would look, new mines were entirely out of the question. The desolating havoc of internal war had changed the scene; prosperity had been scattered and the mines which had produced millions of pounds worth of silver were almost lost to sight. Exotic growths had covered many places where industry and prosperity had reigned. Nothing of the hindrances which had been at work were taken into account. Nothing of the wretched roads and the miserable forms of transit passed before the mind. The glitter of immediate wealth, of sudden fortune, hid the great facts which had spread over the country like a pall. The immoral effects of political disorganisation were not considered. Miners were dispersed, stock had been destroyed, and the labour of building up the numerous works dependent upon the different trades was almost altogether overlooked. Fifty years ago to amend all these drawbacks would require more time than they would to-day. Preliminary works can now be carried out with greater dispatch, and a great proportion of the time wasted as before can be saved. With the abandonment of the mines referred to the spirit of British mining enterprise declined, to be revived again by others, Americans in particular, who are reaping large fortunes from Mexican mining. GABBOTT AND CO.

KAPANGA GOLD MINING COMPANY.

SIR,—Notwithstanding the favourable telegrams reported in last week's Journal from the Kapanga Mine, I trust the directors will at once pursue a vigorous policy by replacing the manager at the mines. I think this is the general feeling of the shareholders, and no partisan of the manager can say that he has not had a fair trial and been ably backed up by the shareholders from time to time. Every few years his cry has been "more money," and the property will turn out remarkably well. The shareholders have responded, with the result that we are now quite as far off in the matter of dividends. Everyone, even New Zealand authorities, agree that the property is very valuable, and if properly managed would pay well.

With the appliances and plant at the mine the returns ought, without any further expense, to be immediately doubled. On this being done the proprietors would see some return. B. W.

Bristol, Nov. 6.

POTOSI GOLD MINING COMPANY.

SIR,—At the meeting of the Potosi Company at the Cannon-street Hotel, on the 2nd inst., somewhat strong language was used with reference to my management. Special considerations prevented me replying at the moment. I might enter into detail which would fully substantiate my position and completely refute the charges made; but I will content myself at present with stating that I have received a telegram from Venezuela as follows:—"The mill is running," and that another telegram from my attorney in Caracas states that the suits against the Potosi Company, involving most important issues, have been decided in favour of the company, which result I claim is due to my personal exertions in the interests of the company since my retirement from the position of general manager.

Langham Hotel, Nov. 8. C. C. FITZGERALD, C. AND M.E.

FRONTINO AND BOLIVIA COMPANY.

SIR,—The progress of this company is not so favourable as the shareholders were led to expect by the various reports presented to them by the directors and superintendent of the mines; indeed, the progress must be considered as very unsatisfactory, principally, it appears, from the high percentage of working expenses. The present directors I believe to be gentlemen of honour, ability, and industry, but I do not think any one of them puts forward any pretension to be more than an amateur in the art of mining. Now, I am of opinion that what the company requires to produce the success we have been led to expect is some gentleman of long experience who is thoroughly up in mining matters to take the chairmanship of the company, and I should think some one so fit for that office could be found. I believe there is one vacancy in the number of directors, and I venture to suggest that our present directors would do well to enter into communication with some competent man with the view of his taking the chairmanship of the company, as I am sanguine that with such assistance they would soon be able to put the company into a state of prosperity. EDWARD DEARLE.

Nov. 6.

IMPROVED SAFETY-CAGES.

SIR,—In answer to "R. M.'s" letter in last week's *Mining Journal* I would disabuse that gentleman's mind as to my supposed displeasure at the undue levity of his first letter. I can assure him that I was anything but displeased, but, on the contrary, elated to think that I am stationed on the same planet as "R. M." and other cage reformers.

Before making his ideas known I presume "R. M." is waiting the advent of the new Patent Laws. But suppose in the interim he is called upon to pay his debt to Nature, who will clear the old safety-cage reformers of "R. M.'s" imputation, which they are doubtless weeping under, that they have hitherto had hold of the wrong end of the stick. I write this in defence of the old reformers, whom I hold in great veneration. W. NINESS.

Perranporth, Nov. 8.

PERRANZABULOE MINES—PERRAN SILVER-LEAD CONSOLS.

SIR,—By all the mining experts who have reported on the mineral set appertaining to the Perran Silver-Lead Consols it is unanimously asserted that it is one of the most important and valuable in the district. The Phœnix lode, which the company are at the present developing, is a powerful and well-defined lode. The engine-shaft is 80 fms. in depth from surface, and when the new winding-engine, which is in course of erection, is complete, the attention of the company will be turned to opening up the lode. The present winding-engine is considered inadequate for the necessary requirements when the several stopes which, it is assumed, will be working in a short time. Independent of the Phœnix lode, there is a parallel one running with a space of 20 fms. to the east; also a caunter-lode coming into Phœnix from the north-east. About the junction of these lodes an east and west lode crosses Phœnix. This important point will be found in driving south. Still further in that direction Phœnix lode comes in contact with the Great Perran iron lode.

North of Phœnix engine-shaft the same elvan course will be met with which produced such valuable results in Penhale or Wheal Golden lode, and a similar effect may be reasonably predicted, therefore, in Phœnix. In point of character and surroundings Phœnix lode might be a counterpart of that of Penhale, the antecedents of which are well known to many readers of the *Mining Journal*. Penhale lode is within 200 fms. of Phœnix to the west. The company have now in contemplation a large scheme in connection with Phœnix, which, if carried into effect, there is every reason to believe that the prestige of Perranzabuloe as a rich mineral district will be restored by one stroke. The scheme, as I understand it, is to amalgamate Wheal Golden and East Wheal Golden setts with that of Phœnix and Penhale. To place a pumping-engine in Wheal Golden engine-house and work East Wheal Golden from thence with flat-rods. By this means Wheal Golden lode could be worked as far south as practicable, and the northern portion of Phœnix or East Wheal Golden developed. To sink another engine-shaft in Phœnix lode 200 fms. north of the present engine-shaft (towards East Wheal Golden), and an intermediate one betwixt this and the present one. To resume sinking the shaft south of the present engine-shaft with flat-rods from Phœnix engine. These shafts would command the whole of the lode, and would doubtless open up a lode to excel in value even that of Wheal Golden. Penhale to be worked by a separate pumping-engine. Of course the execution of this scheme would involve additional capital, but I maintain if such is required that the mining public will rarely have another opportunity of investing in such a *bona fide* concern.

The mine now is only in the hands of a few gentlemen, who have courageously stuck to it, and brought it into the present state, and it speaks well for the genuineness of the concern when the Chairman, directors, and secretary are the largest shareholders in it, as is the case in that of the Perran Silver-Lead Consols. The state of the lead market is a very serious drawback to the success of lead mines, but when the lead is argentiferous to the extent of that of Phœnix and Penhale this should be no impediment to the ultimate success of the scheme described. Although it cannot be denied that it is hard, year after year, to be compelled to put one's hand in their pocket to pay heavy calls in mines in which they invested, in anticipation of speedily receiving a good percentage on their money, the past history of the dividend mines records the fact that, by nothing but perseverance and dogged determination, we can reach the eighth heaven of mining bliss, where calls cease from troubling, and the speculator is at rest.—*Perranporth, Nov.* 6. W. NINESS.

WHEAL COATES.

SIR,—At the meeting of shareholders of the above mine held on the 31st ult I stated "that during the last three months' working under the late manager the mine was only paying its way in consequence of the tutwork being suspended, and that under those circumstances the mine would very soon have come to an end." In justice to Capt. Martin I feel myself bound to say that all the drivages were stopped by orders from the directors, and quite in opposition to his advice and protests. If the south lode from whence "such good results are now expected" had at the time been opened out as Capt. Martin proposed I think very different results would have been shown. The directors of the limited company felt, however, there was not sufficient money to prosecute the work with the necessary vigour.—*Streatham Common, Nov.* 8. J. N. RIPLEY.

WHEAL COATES.

SIR,—At the meeting on Oct. 31 Mr. Ripley denied Mr. Toombs' statement. I beg to inform Mr. Ripley that the drivages were only suspended the last month during the time the company was changed from a Limited into a Cost-book company by order of the board. The last three months' cost and sales previous to my leaving the mine at Christmas, 1881, were:—Labour cost and bills, October, 620*l.* 12s. 6d.; November, 619*l.* 6s. 8d.; December, 617*l.* 2s. 4d.=1857*l.* 1s. 6d. Sales of tin, November, 559*l.* 1s. 5d.; December, 652*l.* 5s. 6d.; January, 666*l.* 0s. 6d.=1877*l.* 7s. 5d. And at the last sale I left in the tin-house 1 ton 10 cwts. clean tin unsold, and 300 tons of tinstuff unstamped. This the late resident agent and dresser acknowledged on my leaving, and the first 16 weeks under the present company show the position I left the mine, and what have the sales been since.

Pednavounder, Sithney, Nov. 7. W. H. MARTIN, Late Manager.

COPPER MINES OF DERBYSHIRE—ECTON.

SIR,—In the article on the Ecton Copper Mine, which appears in last week's *Mining Journal*, no mention is made of the interesting fact that at this mine gunpowder was first used for blasting. In Bishop Watson's Chemical Essay (Vol. 1, Essay 10, Of the time when gunpowder was discovered, Cambridge, 1781), the following account is given of its introduction:—"I have known that country where the mine is above 50 years, and have often seen the smith's shop in which, tradition says, the first boring auger that had ever been used in England was made, and that the first shot that was ever fired in Derbyshire or Staffordshire was fired in this very copper mine at Ecton. The inhabitants of Wetton tell me the auger was made by some German miners sent over for by Prince Rupert to work this copper mine at Ecton. The Prince came into England 1636, and was ordered by the King to leave the kingdom 1645; and though he was afterwards admiral under Charles the Second, it is most probable the miners came during his first abode in this kingdom. I am very well convinced of the truth of the above tradition, because the fathers of my informers might be very well acquainted with the miners that introduced blasting among them."

The marks of the German boring augers may be seen at the present time in the so-called Dutchman's adit at Ecton. The name of this adit is philological evidence that the mine was at one time worked by German (deutsch) miners. In conclusion, I should like to correct a mis-print in the article of last week. The author of the Mineralogy

of Derbyshire, from which a description of the Ecton Mine is extracted, is stated to be John Maise, instead of John Mawe.

Nov. 6. A. R. S. M.

WHEAL BENNY MINING COMPANY.

SIR,—I have just returned from a flying visit to this mine, where on my arrival Captain Cocking, the agent, pointed out to me the enquiry of "Veritas" in the Journal of Sept. 27, which I had not seen previously. Should "Veritas" like to satisfy himself personally as to the mine, he will find it at Latchley, two miles from Gunnislake, to which a coach runs daily from Tavistock. The company entered into possession of the sett in the summer, and have just completed the erection of a wheel, and nearly finished the dressing-floors, &c. The object of my visit was to be present at the turning of the wheel, which was accomplished yesterday to the entire satisfaction of a co-director also present—a civil engineer of 30 years' experience, who said he had never seen a better wheel—and myself. The hauling-rope was also satisfactorily wound on the drum, and directly the skip is delivered hauling operations will be commenced, probably the day after to-morrow. The stamps are on the mine, and will, it is hoped, be at work by a month from this date.

The mine, situated close to Devon Great Consols, is now being worked on the Benny lode, which is 6 ft. wide at the deep adit just above the surface of the River Tamar, and is at that point so rich that a stone broken from the lode in my presence, and handed by me to the Demonstrator of Chemistry of the Royal School of Mines, assayed 34 or 35 per cent. of tin and 18 per cent. of arsenic, and there are indications of large deposits of ore a little lower. The ground rises precipitously from the river bank to a height of 200 to 300 ft., and all above the river is drained by the deep adit, giving a vast deposit of ore to be had independent of pumps. There is a good supply of water for the wheel, and when required a breast-wheel can be put into the Tamar, giving hundreds of horse-power. I think, therefore, we are justified in hoping for a brilliant future to the mine, which hope will be brought to the test of practical experience in less than a month's time.

Warwick-square, Nov. 8. CHARLES N. F. CRAUFURD.

SLATE, AND SLATE QUARRYING.

SIR,—Your correspondent, Mr. Thos. Gill Jenkins, writes a long letter upon slate, and slate working. Will you allow one who has some practical knowledge of the matter to say that book-learning will never make a slate quarryman. That the agents in charge of most underground quarries about North Wales are men well up to their work, and are often second to no miners in the world. That if an agent had to be replaced many a bargain-taker could step into his shoes at a day's notice, and that many of the men with their three-foot stick will do as good work as a surveyor's assistant from London. That anyone in the position to let bargains would make a mistake between 30 yards and 30 ins. in the North Welsh slate district is utterly incredible.

There is something really deplorable about mining in this part. It is that although millions of capital can be raised in our country to squander on mines in India and America, not a tithe can be got to work good lodes here, within a stone's throw of everyone contributing, and where every man having money in a concern could see the places for himself, and find out all about his agents' daily conduct, even to what they had for dinner the same day at the cost of a day's outing, and say three sovereigns train fare. Is it as with farmers that the best men are to be steadily driven out of the country, the land to be left to the gentry and their agents, and that anyone expressing views contrary to these people is first of all to get a bad name and then if he has the means emigrate, carrying with him, I must say, the reverse of a lively feeling of affection for the land he leaves.

Glanyrafon, Ganllwyd, Nov. 7. HENRY J. MORITZ.

PRACTICAL SLATE QUARRYING.

SIR,—I have read Mr. Jenkins's letter on the above subject with interest; and although no doubt whatever the system at present adopted in North Wales and elsewhere for mining or quarrying slate from chambers has great need of a thorough revolution, yet I am not prepared to make a sweeping charge against those who manage the working out of such chambers; but rather, on the contrary, admire the boldness and the nerve of the men who ventured to perform the work—for the chambers while their roofs remain will stand as monuments to their memory, but the pillars supporting those roofs may yet be attacked by the engineer, and honeycombed to such an extent for the valuable slate they contain that their duration may be greatly shortened.

I am acquainted with several slate quarry managers in Festiniog, and I know the vein. Will Mr. Jenkins inform me where a quarry has been opened on that vein that has failed through mismanagement? I say it was not the mangement that caused the great loss of money during the slate mania 20 years ago. It was through promoters rushing into slate mountains, whether pure or bastard, and not knowing the one from the other. I have known an instance where 37,000*l.* were expended on inclines and galleries, and after this money was expended I was applied to to run in a tunnel with the cleavage, and afterwards cross the vein, making slates all the way. After doing this I condemned the vein; this trial cost 500*l.*, and the same argument stands good at the present time to all those who venture upon an unproved vein. That is to drive a tunnel if possible across the vein before commencing to open floors or chambers as the case may be, but even on a proved vein the same is necessary, as there may be a sudden fault as there was at Menoffern, Festiniog, where the vein fell all at once about 100 ft., or it may be squeezed together by the hard rock as at the Wrysgwyn on the same vein. A vein of good slate may keep a bad manager, and may pay without machinery, while the best man to be found cannot with any amount of machinery make a bastard vein pay.

There are to my knowledge four veins in North Wales which I would consider safe to speculate upon—those are the great Carnarvonshire, the Festiniog, the Corris small vein, and the large one which runs parallel with it; and as these latter three are quarried by chambering, and the system of doing so must be thoroughly altered before a manager can well work to a plan as Mr. Jenkins suggests. Foot joints and faults make plans of their own, and I would prefer a quarry that had neither. Slate works so well with machinery, that all tunneling should be done by it. Then comes unroofing in slate nearly vertical, as the Corris veins; this can easily be accomplished, and slates made from the rock thereby removed. The free sides and loose ends can all be done in the same way and slates made as in the other case; then the mass can be cut out in terraces, just like a staircase, with steps (say) 2 ft. 2 in. high; and in this latter case a very small machine would produce 30 tons per 24 hours of blocks sawn at both ends ready for splitting, and without the use of a blasting agent. These blocks can be easily laid on a truck by one man, who can be steadily at work with others removing as the machines produce. When unroofing and cutting free sides and loose ends can be done by a method which will pay for the labour, and then the rock so relieved cut out at half the present cost, and with no injury from blasting.

Then slate quarrying, even where the veins are narrow, will pay. I do not say that slate lying in all positions can be worked in this way, but where the cleavage and pillar are nearly vertical the system could best be carried out.—*Egham, Nov.* 5. GEO. HUNTER.

COPPER SMELTING—MORE SUCCESSFUL VENTURES.—The copper smelters of the Valverde and Queen City Companies, located in Grant County, recently went into blast, and are working most successfully considering the many failures that have been made in like enterprises, both in this territory and Colorado. It is a pleasure to record such instances of success. The works referred to are the Pacific Copper Smelters, made by the well-known firm of Rankin, Brayton, and Co., of San Francisco and Chicago, and which are now in general use and in great favour in all mining districts of the country. We are glad to know that our mining men are now learning what has long been the practice on the Pacific—not to experiment in machinery for reducing ores, when well-known and tried appliances can be had that can be counted upon with a certainty for success, and which involves no risk to the purchasers. When all chances regarding the manipulation of ores are thus eliminated from a mining proposition, leaving only the question of product and management, mining will soon come to be regarded as the safest, as well as the most profitable business in the country.

— *New Mexican Mining News, U.S.A.*

REPORT FROM CORNWALL.

Nov. 8.—Mining affairs still drag somewhat heavily along, and hopes are still unrealised. But, after all, what we have most to complain of is inactivity, rather than lack of confidence; and in this respect mining can hardly be regarded as worse off than trade generally, which, at any rate in the West, is pretty well dull all round. It is only in a few favoured localities and in a few special businesses that there is really what we may fairly call activity. We fail, however, to see any grounds for despondency.

The discovery in West Frances, especially since it has been explained by Capt. Thomas, to whose professional skill and perseverance it does so much credit, will do a good deal to maintain the drooping faith in western mining, which seemed once again to be creeping into fashion. Four months ago the adventurers held "the most dismal account" that Mr. Pike ever recollected; and now that the lode that Capt. Thomas has been patiently working so long has been cut, all is bright, and there is the direct prospect, not only of the speedy resumption, but of the long continuance of dividends. The great lesson here is, that success has been won, not by mere luck, but by wise endeavour, and this surely should stimulate.

There seems every probability that good has so far sprung out of evil that there will be a very general overhaul and definite statement of mine accounts, so far as the chief mines that are managed in the county are concerned; and that we shall be able, therefore, to reckon exactly what the current financial position of mining ventures may be. The reckoning at West Seton was not, as we have already said, a pleasant one; but it was a step in the right direction, and no friend to legitimate mining would complain if it were universally adopted. The "no credit" system is a capital one, but it is not capable of universal adaptation—at least in the cases of many old-established mines it could not be introduced without considerable difficulty.

The practice of crediting unsold tin has come in for its due share of censure of late, and, as it seems to us, something more. We do not believe in crediting tin that has simply been broken in the stone, and it may be has never been drawn to grass; but when the tin is dressed and ready for sale is it not a definite asset, with a value ascertainable within very narrow limits? Surely a manufacturer who is taking stock credits himself not only with his actual sales, but with his partially manufactured goods and goods in store ready for the market, or to which he debits himself with the cost of raw material, and the proportionate expenditure in labour and on plant. It seems to us that if you bring up the accounts of a mine absolutely close, and charge up every item of expenditure, you are bound to take into account also whatever tin there may be in the hutches. The mischief does not lie in crediting unsold tin, but unprepared tinstuff; and the only excuse for confining credits to absolute sales is the too general looseness of accountantcy, which has allowed costs to run back in equal or even in greater proportion. When costs are behind tin unsold is really not an asset, because of its liability to the charges of production. These ascertained and set forth, a ton of tin in stock is as much an asset as an ore bill not at maturity. Granted that the crediting of unsold tin as too often practised has been an evil, it still remains the fact that it is not the crediting of the manufactured article that is wrong in itself, but the manner in which it has been done. It is never advisable to confound things that differ; hence our remarks.

We shall hear something more ere long of the Dolcoath fine and the interest thereon, demanded and paid in spite of all protestations. Of course if the law gives a man a pound of flesh, and there is no Portia handy to invent a neat legal shuffle, there is no remedy. And yet there are people who are astonished at the moderation of the world!

The North Cornwall Railway may now be regarded as a certainty, for it has been officially announced that the contract for the execution of the works has been entered into with Messrs. Curry, Reeve, and Co., of Westminster, who will begin the work as soon as circumstances admit. The construction of this line cannot fail to have a stimulative effect upon the quarrying enterprise of the district, and probably will lead to some revival in its mining industry, which is at present almost at the very lowest ebb. There are several mining areas in North Cornwall that deserve more attention that they have had of late.

REPORT FROM DERBYSHIRE AND YORKSHIRE.

Nov. 8.—Of late several meetings of miners have taken place in different parts of Derbyshire with respect to an advance of wages, and a decision come to in favour of the 15 per cent. advance. This is only what might be expected, for few persons employed in any business would refuse an advance if it could be got for the asking. But as regards the miners this is not likely to be the case, seeing that they are now in a better position than for some years past. In a local paper, in an advertisement for colliers, it is stated that the average wages of the getters in the mine is 6s. 6d. per day of eight hours, and 4s. a-day for labourers. This shows that really good miners in the place alluded to should be making there 8s. or 10s. a-day, and these men are asked to strike for more money. It need scarcely be said that they will think the matter over more than once before they follow the advice of those who assume the *rôle* of leaders, but who do not work in the mine, but are maintained by those who do. The agitation, it may be said, has not had much effect in the Coal Trade, which is still of about an average character for the time of year. Business with London, indeed, has been rather quiet, and prices are not so firm as they were for house coal, which is the description of fuel principally sent from Derbyshire. There are a few contracts in hand for steam coal for some works in the Metropolis, but there is not much chance of any getting on to the Thames for the use of the steamers, owing to the cost of lighterage. A scheme was brought forward some time since for taking the coal to Boston Deeps by railway, and then shipping it in sacks for London, by which means it was stated that the coal could be sold to the consumers at 3s. per ton lower than it now is. This scheme appeared to be feasible, but for some reason or other it appears to have been dropped.

Some of the Scotch colliery owners, it is stated, are about to send coal by steamers in sacks, and sell it from 4s. to 5s. a ton below the current rates. With this proposal in view, it has been suggested that the various railway companies connected with the inland mining districts should now reduce their rates before they are compelled to do so by the threatened competition in the shape of more sea-borne coal being sent to the Metropolis. Just now a large tonnage of gas coal is being sent from several of the pits in Derbyshire both to the south and westward, the Staveley and some other companies having good contracts in hand, whilst the requirements of the gasworks are now heavy. In other descriptions of fuel there has been no material change. Considering the unfavourable state of the iron trade in all the great centres, a very fair business is being done at the works in Derbyshire, the production being up to the average, whilst stocks have not sensibly increased. A good deal of what is made is used by the producers in pipes, pillars, and other castings, for which Derbyshire holds a high position. More is also doing in rolled iron, as well as in malleable material.

The approach of Christmas has, as usual, stimulated several of the Sheffield branches of trade, so that there is now a scarcity of work in but few departments. Of course there are certain trades that have their season, and these of course are not now so busy as others. A most extensive business is done with distant countries in sheep-shears made in Sheffield, and the busy time for these has not yet arrived; still there is a fair output. But nearly all the cutlery establishments are well supplied with orders for knives of different qualities, and more is being done in light and fancy steel goods for the fitting of cases and bags. Saws, joiners', and heavy tools for engineers are in steady demand, as are steel hammers, picks, and mining implements; but much is being done in Bessemer rails, but in other descriptions of railway material, including springs, tyres, axles, wheels, and wagons. In crucible steel there is a steady output, both on home and foreign account, the local requirements as regards special qualities being on the increase In the heavy branches there has been no diminution in the activity which has prevailed for a considerable time past, so that the great works of Brown and Cammell's are turning out a vast quantity of material in the shape of rolled iron. Steel faced armour-plates, of course, take the first place, and in them there is plenty doing for our own and other Governments. Although there is a good deal of competition as regards ship-plates, which are extensively produced close to some of the shipping ports in the North of England, yet the Sheffield makers are now doing well in them, being able to hold their own as regards quality and other requirements. Boiler-plates are also in steady request, and there is a considerable output of various descriptions of telegraphic, umbrella, and other wire. Some of the foundries are not so busy as they were earlier in the year, not so much being done in fancy stoves, grates, and cooking ranges, although the season for them has been a tolerably active one. In heavier work, however, such as castings for mining machinery, pulverisers, and washers there is still a fair amount of business being done.

The engine-works continue to be fairly employed in most departments, and the same may be said as regards the various mechanical branches located in the town and district. In the silver and plated trades there was more than usual quietness during the summer; but, as usual, when Christmas is within "measurable distance" of some six or seven weeks, then there has been a change, and this year has not been different from the preceding ones, for those branches are now much better off than for a long time past, goods being required for delivery before Christmas and New Year, the great festival for presents of fancy and costly ware. The colliers in the neighbourhood of Sheffield are working well, but there is no push in any direction, excepting in a few instances for steam coal. Households are not in particularly brisk demand, although this should be a very brisk time, more especially when the miners are clamouring for more wages.

REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

Nov. 8.—Coal prices for the present remain without change except in the case of a few collieries, where rather better prices are being got for forge coal. One of these—the Conduit Colliery, Brownhills—has advanced prices by circular 6d. per ton, making common forge 6s. per ton. For best forge coal the general price of South Staffordshire at present is 7s. to 7s. 6d. Inferior house coal is 9s. per ton, and best, from Cannock Chase, 11s. Furnace coal is 9s. to 11s. per ton. Cokes are quiet of sale at 16s. for best South Yorkshire qualities. Gas cokes from Nottingham are 12s. 6d. to 13s. per ton delivered, but North Staffordshire sorts may be had at 10s. and 10s. 6d. delivered into South Staffordshire. Northampton ironstones are 5s. 6d. to 6s. 6d. delivered, according to station. The pig and finished iron market is without alteration on the week.

At a meeting of the Mines Drainage Commissioners held in Wolverhampton yesterday, the Chairman (Mr. Walter Williams) announced the re-election of seven of the retiring commissioners, together with Messrs. W. G. Bagnall, coalmaster, Stafford; E. L. Beckwith, Chistlehurst, Chairman of the New British Iron Company; and William Lee, Leatherhead, Chairman of the Tibbington Coal Company (Limited), as new members. Upon the motion of Mr. J. B. Cochrane it was resolved that Mr. Walter Williams should be re-elected Chairman for the ensuing year. The arbitrators propose to levy a rate of 3d. per ton on fire-clay and limestone, and 6d. per ton on ironstone, coal, slack, and other minerals in the Old Hill district. Appeals will be heard in Wolverhampton on the 17th inst.

The arbitrator to the Coal Trade Wages Board has intimated to the secretaries that the positive refusal of the men to accept other than certain specified terms as to the minimum, and the way of arriving at the charges of rates precludes him from coming to any decision upon these questions. The colliers, it will be remembered, will accept no minimum under 3s. 8d. per day, nor will they allow anything but coalowners' published price lists to determine prices realised.

Certain of the leading ironworkers are making an effort to "organise" their fellows in North and South Staffordshire, Worcestershire, Shropshire, Lancashire, Derbyshire, and South Yorkshire. At a conference in Birmingham on Monday, which is set down as immediately representing 5000 men, and indirectly 40,000 men, it was resolved to establish a general association of ironworkers for the Midland counties, the area of its operation to include the districts specified. Mr. James Capper, the secretary of the ironworkers' section of the Wages Board was appointed general secretary, with head offices at Walsall, the president to be hereafter elected from the 12 districts into which the Association is to be divided, and whence shall come the members of the general council. A committee has been appointed to draft the constitution for the society, which is to be friendly; indeed must uphold arbitration and conciliation. It was asserted that all the districts in which wages are regulated by the Wages Board of South Staffordshire are friendly to the movement, and will join it. How far this will be supported by actual membership has yet to be shown.

REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

Nov. 8.—Staying at a farm-house close by the Wotherton Barytes Mine last week, I walked over to the mine in the afternoon, and had a pleasant talk with the intelligent and obliging manager, Captain Yelland. Properly there are two mines here—one on the property of Earl Powis and the other on that of Sir Offley Wakeman. The first is the easternmost, and it was worked originally by a Mr. McGilvnes, who is said to have obtained 5*l.* a ton for the barytes, and to have sent large quantities to America, the result being a large fortune. This mine is now only worked by a few men. The second produces about 3000 tons of sulphate of baryta every year. It is 130 yards deep, and about the same length. The lode is a strong east and west lode, ranging in width from 18 in. to as many feet. The barytes is of a fine white colour, with occasional discolourations from the presence of other minerals. The minerals occasionally contain cavities, in which there are beautifully formed crystals of sulphate of baryta up to 4 or 5 in. in length, rarely as large as this. With the barytes there is associated carbonate of lime, which is also frequently found in a beautifully crystallised form, which also shows the different stages in the growth of the crystal, as the contributory matter was charged with copper or lead or manganese or iron. The mineral is sorted, washed, and ground at the mine, and then carted six miles to a railway station. Two schemes for railway accommodation for this district between Montgomery and the Shropshire lead mines are now in progress. There is no doubt that the one, whichever may be, that will afford facilities for this mining industry, as well as accommodate the wants of the neighbourhood generally, will be the most valuable

The word zinc towards the close of my last report should read lime. In the Festiniog slate district the principal slate quarries are limiting the working time to four days a week. Notwithstanding this no less than six fresh quarries are about to be started, or rather restarted, for most of them are old ones. In the Carnarvon district the slate trade is better, and loading is going on pretty freely at the port, nor are stocks over large. A pleasant place for a mining or quarrying man to stay at for a few days is the Snowdon Ranger. It is about seven miles from Carnarvon, and you reach it by the narrow gauge railway, which joins the London and North Western line at Dinas Junction. Two or three miles up this line is Tryfau Junction, where a line branches off to serve the slate quarries about Moel Tryfau, Braich Fron, Alexandra, &c. Then we reach in a station or two Bettws Garnon, where the great Cambrian slate range crosses the valley, great quarries being on both sides of us. Next we come to the first slate quarry in the lower silurian strata, Pas-y-nant, and soon land at the Snowdon Ranger. Snowdon, already capped with snow, rises behind us, Moel Hegog in front of us. Below our feet

for a mile and a half stretches Lake Quellyn. A little to the south there is the fine slate quarry Glanyrafon in full work. Beyond there is the Snowdon Quarry, Clogwyn-y-gwyn, Caegors, and a number of incipient trials. Over the hills to the west there are the Prince of Wales and Gorsedda Quarries, and the ancient copper mines of Drws-y-coed We chanced to meet on our visit this week one of the earliest managers of copper mines in the district, and he told us that he has sent many parcels of copper from the Snowdon Mines at 22s. per unit. There was some chance of obtaining a profit in those days.

The purchaser of the machinery at the Talargoch Lead and Zinc Mines leaves the machinery there for the present, in order that the miners may get what ore they can on their own account. But the mining village and community now seems doomed.

Further east I see a company is forming to work the ground west of the Great Holway Mine, to whom I wish success. Opposition is rife to the ship canal on the Dee. It will affect the salmon, the drainage, and nobody knows what besides. Still, the scheme is being vigorously pushed on. The colliers are going in for an advance of 15 per cent., and the movement to be simultaneous in North Wales, Lancashire, and Yorkshire.

TRADE OF THE TYNE AND WEAR.

Nov. 6.—There is little change to note in the state of the general trade of this district. On the whole there is a healthy tone to report in most trades, but no great advance in the value of any of the produce either of raw materials or finished articles. The value of coal has advanced a little during the present year, but at present prices are stationary, and not likely to advance much further unless a severe winter should occur, which would no doubt have the effect of materially advancing the price of house coal. The Steam Coal Trade is, of course, rather quiet, as the Baltic season is about closed. Some of the works are, however, still fully employed, and others are worked four days per week. In former times large quantities of this coal were stocked during the winter in readiness for the spring trade; but, as a rule, no stocks are now made. The coal is only worked for immediate shipment, and as they are well cleaned and screened at the pits they are shipped in excellent condition. There is now a large supply of ships and steamers of all kinds on those rivers, and tonnage is cheap, and the trade ought to profit by the circumstances as steam coal will be sent to the Mediterranean and to the various coaling stations in the South and East. Already cargoes of local steam coal are finding their way to Malta, Gibraltar, Port Said, &c., and will certainly be sent in considerable quantities to those markets during the whole of the winter months, so that it is expected the steam coalworks will be well employed. In Durham the demand for gas coal continues very strong, and the shipments at Tyne Dock and at other principal shipping places on the Tyne and Wear continue large. The demand for coke continues fair at late rates. There is no prospect at present of any increase in the value of coke.

The iron shipbuilders on these rivers continue to be well employed so far, and frequent launches of steamers, generally of large size, take place; but the enquiries for new steamers are not numerous, and the orders on hand have been considerably reduced during the past few months. Engineers and boiler-builders, founders, &c., continue to be well employed. There are no strikes of any kind in this district, with the exception of the engineers' strike at Sunderland, and no progress has been made during the past week towards the settlement of this strike. The engineers, as we reported last week, appear at present to be anxious to arrange the matters in dispute, and they have made certain proposals to the masters for this purpose. Those proposals were issued last week by the men on strike; the circular issued by them referring to the future rate of wages, and suggesting, though rather vaguely, that mutual concessions in the apprentice question should be made as one of the heads of a basis for conference. The proposals of the men were considered at a meeting of the masters on Saturday last, and after a lengthened discussion it was concluded that they did not consider the basis set forth satisfactory, and consequently a conference is declined. The masters are determined to hold the position they have taken up not to allow the men to limit the number of apprentices, and also to adhere to the present rate of wages. The engineers' wages at Sunderland are quite as high as the wages of similar classes of men in the district, and it is certainly not reasonable for those men to demand an advance of 2s. per week.

The Iron Trade has continued in a depressed and unsatisfactory condition, as last recorded. Prices have receded still more, with a weaker tone, and as the shipping season is now so near closing both makers and merchants are now anxious to sell. The shipments for the past month have been very satisfactory, reaching a total of nearly 100,000 tons—the largest delivery for any month in the year. Stocks will, therefore, have been reduced, and in the ordinary course the market ought to have been strengthened, but the state of the Scotch market has had an adverse effect. Should the present rates continue some of the furnaces unfavourably placed will no doubt have to be blown out. The manufactured iron trade is, of course, dull; especially as it is feared that the shipbuilding trade may decline in the winter. The works are, however, pretty well employed so far. Ship-plates can now be had at 5*l.* 17s. 6d.; bars, 5*l.* 12s. 6d. The rates for pig-iron have not essentially changed since last Tuesday, and are about 38s. 3d. No. 3 pig-iron. The shipments for the week have been pig-iron 22,213 tons and 6621 tons of manufactured iron and steel. Connal's stock of warrants is still declining, and are now 66,395 tons—a reduction of 1032 tons on the week. The household coal trade is very active. Coke is quiet from 9s. 3d. to 9s. 9d. at the ovens. Steel rails have now almost entirely superseded iron rails, and the same change must inevitably occur in the plates for manufacturing ships. Steel will no doubt eventually be used almost exclusively in the place of iron for constructing ships. It is, indeed, the opinion of some high authorities that wrought-iron will disappear altogether, and steel will take its place. When the iron rail trade collapsed Cleveland felt the blow severely, as no steel rails were manufactured there at that time. So far most of the producers of plates in the district cling to the old style—making iron plates; but one of the greatest producers in Durham—the Consett Iron Company—is now making both iron and steel plates. At the present time there is only about 30s. difference in the price of steel and iron plates at Glasgow, and there is little difference in the price of iron and steel angles. It must be concluded that it is dangerous for the east coast of Durham to depend upon the demand for iron plates and angles alone. There should be provision made for the supply of steel plates, as a demand for them is certain to spring up. The steelworks of the Armstrong-Mitchell Company, at Elswick, will not be in full operation until the latter part of next year.

The returns of the Cleveland ironmasters for October have been published, which show that the furnaces in blast were the same as for the previous month—118. The make of Cleveland iron for the whole district was 157,627 tons, or an increase of 9546 tons in September, while the make of other kinds of pig, including hematite, speigel, and basic iron, during October was 80,631 tons, which was an increase of 5598 tons as compared with September; the total make of all kinds of iron being 238,258 tons, or 15,144 tons more than the output in September. There were at the end of October 83 furnaces producing pig-metal, and 35 furnaces making hematite iron, &c. The actual make of all kinds of iron in October was greater than in any previous month of this year. This fact ought to be borne in mind—there is a continued increase in the production of all kinds of raw material as well as in manufactured articles, and yet we have complaints that never cease of small profits or no profits at all. The exports of coal from Tyne Dock during the past week were, we believe, the largest on record, and in the Wear the shipment were also very large. There has been a great deal of discussion of late in this district respecting restricting the output of coal and make of iron, and some influential journals strongly advocate restriction, but it has, we believe, been clearly proved by experience that restriction in the iron trade here has proved a failure, and any attempt to improve the position of the coal trade by the same means would also prove a failure; but there appears to be no reason why increased output and make should not be studiously avoided. If this were carried out it is only reasonable to suppose that the demand would ultimately come up to the supply, and thus fair prices would be realised.

There has been a large business done during the present year in the fire-brick trade, and also in all fire-clay goods; but at the present time these trades are rather quiet as usual at this time of the year. Stocks can, of course, be made with this class of goods, and this is now being done to some extent. The chemical trade on these rivers continues good, with a steady demand, there has been no change in the price of the leading products—bleaching powder, soda ash, &c.—during the past two or three weeks; but it ought to be noticed that the value of the leading chemical products have been advanced enormously during the present year, more so than any other manufactured articles. Bleaching powder at the opening of the present year was only a little over 4*l.* per ton, and at the present time it is more than double that price; it has, indeed, been sold lately for forward delivery at 9*l.* per ton. This great improvement has no doubt been brought about mainly by an increased demand from America and other foreign markets; but the low state of the trade during the past few years caused the stoppage of many works, and the make was consequently much reduced, and at the large works kept going the make has also been curtailed to some extent.

Mr. de Lesseps starts for London on Thursday morning, and it is understood that he has accepted the invitation of the Newcastle and Gateshead Chamber of Commerce to pay a visit to the Tyne, when he will receive a hearty welcome. A larger number of vessels from the Tyne pass through the Suez Canal than from any other port in the kingdom.

TRADE IN SOUTH WALES.

Nov. 8.—The rise of 2½ per cent. in the wages of the men employed in all collieries connected with the South Wales and Monmouthshire Association has given immense satisfaction in all the coal valleys. Other collieries not in the Association are guided by the acts of the Conciliation Board, and thus the rise becomes general. Unexampled activity characterise the Steam Coal Trade at the present moment, and the shipments are becoming larger, that at Cardiff last week being the greatest on record—161,669 tons foreign and 21,068 coastwise; Newport also exhibited excellent totals, 39,195 tons foreign and 22,732 coastwise; Swansea, on the other hand, was not large, being 20,609 tons foreign and 6036 coastwise. Prices are firm, from 10s. to 11s. 3d., with 9d. additional for double-screened. The colliers are agitating for a greater amount of vigilance in the matter of inspection. They say that the present Inspectors have too much to do, and that the secretarial duties imposed upon them takes up nearly the whole of their time, so that it is impossible for them to go below the surface except in special cases, where some catastrophe has taken place. The following extract embodies some of their ideas:—The Mines Sub-Inspectorship Question is beginning to agitate other sections of colliery circles beside the workmen. The agitation on the part of the men is not wholly condemned. It is admitted that the present Inspectors and sub-Inspectors of Mines have too much work to enable them to fulfil the duties which they have to discharge. One remedy, however, which is suggested is to relieve these gentlemen from all work except that of inspection; let them not be surfeited with secretarial work, and thus give them more time for visiting collieries. At present they have to carry on correspondence and compile returns which involve necessarily much arduous labour. These returns ought to devolve upon correspondence assistants. Then as to the appointment of workmen as sub-Inspectors, it is submitted that they have now such chances. All that is required is that they should pass examinations, and be conversant by experience with the requirements and responsibilities of colliery management. But the men could not from the very nature of their position accept this solution of the problem. The men to act for them should be those of their own class not connected in any way with colliery managers. Once a man has become a manager he would, they contend, lose sympathy with the workmen. The only present solution would seem to be the appointment of workmen to sub-Inspectorships, provided they pass the examination after filling the duties of a miner, but without the necessity of having first held office as a mine manager. As to the examinations, the South Wales College will be a material help, and the men could send and educate some of their most intelligent and devoted fellow-workmen there to learn what has to be known.

The dispute among the Bessemer steel men at Tredegar has been adjusted satisfactorily. There were several large parcels of iron sent away from Newport last week as follows:—Cape Town, 2750 tons; Bombay, 2300; Buenos Ayres, 1700; Bahia, 540. From Cardiff only 324 tons were exported. The iron ore trade remains depressed. Arrivals are slackening. Cardiff received last week from Bilbao 6193 tons, and 1682 from other ports; Newport, 9848 tons from Bilbao, and 3782 from other ports.

A local correspondent writes:—There is such an intimate connection between the coal trade and the iron and steel industries of South Wales that it will hardly be held discursive to glance in this relation at the latter. Iron is being superseded by steel, and for this material the demand, I glean from very high authority, the prices obtained are still unsatisfactory, A 10 per cent. reduction of wage was very recently effected, and ominous rumours have been afloat of another probable reduction. These depressing statements have received no official confirmation. In the case of one large works they have been authoritatively contradicted. But it is not the slightest use to blind the men or the public, even unintentionally, to the actualities of the case. Without indulging in prediction, I may say that in quarters by no means indifferent to the interests and sufferings of the men, the downward movements of the market, as they are characterised, are canvassed in foreboding accents. It remains to be seen to what extent the proposed South Wales and Monmouthshire Conciliation Board for the steel and iron works will succeed in bringing about reciprocity of sentiment between the employers and the employed. It is to the credit of the steel and iron workers that they have with such honourableness of word and deed adhered to the resumption of work upon the 10 per cent. reduction, especially bearing in mind the hard fight for scanty subsistence which scores of their numbers have had to make. They are entitled to the respect of the trading community for the integrity of their dealings. Their leaders have exhibited most creditable discretion and moderation of temper.

The Tin-plate Trade again exhibits signs of retrogression. Good IC cokes only realise from 16s. to 16s. 6d., and some are reported to have been sold as low as 15s. 9d.

COMPRESSED AIR LOCOMOTION ON TRAMWAYS.—Nantes is endowed with perhaps the most perfect and convenient system of tramways to be found in any large city. Worked on the compressed air system, without noise or dust, they have besides an almost absolute immunity from accident. It is lamentable, therefore, to record the fact that hitherto they have not proved a financial success, and this in the face of the fact that the working expenses per mile are considerably lower than either steam or horse tramways. During last year the Nantes tramways carried 2,142,241 passengers. Their gross receipts were 318,320 fr., or an average per working day of 877 fr., or per kilometre 79·02 c., whilst the working expenses amounted to 72·062 c. per kilometre. The company attribute these depressing results in the main to a series of wet Sundays, on which days they count for their largest harvests. As a proof that these tramways rely more on pleasure than on business traffic may be adduced the fact that they took in the month of July nearly double the amount received in the month of January. To an outsider, however, their failure to prove a financial success may be attributed to another cause—the excessive charge for wages, owing to the number of persons employed by them. It seems absurd to suppose that it should be necessary in order to carry on the traffic that a driver, conductor, inspector, and stationmaster should be employed. There are a number of stations (or rather shelters) for passengers, each of which is manned by a stationmaster, clothed in a neat uniform, and who appears to have no ostensible duties to perform, and, finally, the inspector constantly wandering over the line. To sum up, out of a total receipt of 14,500*l.* over 2700*l.* is devoted to wages alone.

ANGLO-FRENCH TRADE.

The extent of British trade with Bordeaux during the past 12 months has further increased, and the tonnage of British steamers visiting the port in 1882 was very considerable. It appears from the report of Mr. Consul Ward that about 30 per cent. of all ships arriving at or departing from the port were employed in the trade of Bordeaux with ports of the United Kingdom. The consumption and importations of British coal, the only kind to be met with at Bordeaux, experienced a further increase last year in consequence partly of the further development of steam navigation at this port, and partly of the increased demand for coal for household use in the town. The prominent branches of industry in this district are of course those connected with the production and trade of wine. There are, however, some very extensive establishments at Bordeaux for the manufacture of carpets, glass, sugar, several large iron foundries, the well-known manufactory of pottery, a Government tobacco and cigar factory, cotton and linen mills, and several other factories of less importance

With regard to public works mention is again made of the proposed canal from the Atlantic to the Mediterranean. Further investigations regarding the practicability and probable cost of this canal have taken place lately, and have resulted in the view that owing to many unexpected difficulties with which its construction would be beset, the costs would probably amount not to 500,000,000 frs. but to about 1,400,000,000 frs. As this large sum would not even include the expense of the requisite military defensive works, it is thought here that the whole project may be regarded as likely to be abandoned. The new dock at Bordeaux was visited last year by 267 vessels, with an aggregate tonnage of about 138,000 tons, and has therefore given some evidence of its usefulness, which was considered rather doubtful previous to its completion by many persons. The insufficient depth of water in the dock itself, and particularly in the entrance channel, which renders the same inaccessible for the larger class of steamers frequenting this port at present, is, however, much complained of, and the speedy construction of a second and more commodious dock with a greater depth of water, and an entrance at a more suitable point of the river, is generally desired at Bordeaux. It is furthermore the general opinion of all competent persons at the port, that it must be considered very essential for the maintenance of its commercial prosperity that the long-contemplated measures, both for deepening the harbour and the river below Bordeaux, and for constructing proper arrangements towards facilitating the discharging and loading of sea-going ships at this town, should no longer be delayed. The execution of these works has, it may be added, already been sanctioned by the French Government, and the requisite funds towards their expense were voted two years ago by the Legislature.

As to the Anglo-French Commercial Treaty some interesting observations are contained in a recently-published report of the Bordeaux Chamber of Commerce, which may be regarded as a summary of the prevalent opinions amongst commercial classes of the district with reference to the conclusion of a new commercial treaty between Great Britain and France. If (says the Bordeaux Chamber of Commerce) we compare our existing economical *régimé* with that which was in force previous to the abrogation of our treaties of commerce, we are forced to acknowledge with sorrow and bitter disappointment that the new *régimé* is less liberal than the old one. Instead of having made progress, as we had a right to hope, upon the fertile road of commercial freedom, we have retrograded. Doubtless—and this is a gain which we certainly should appreciate—our general tariff is more liberal and more rational than the old one, but it is only the least important part of the commerce of France which is subject to this general tariff, whilst the larger proportion remains subject to the provisions of the conventional treaties, and it must be allowed by all that these treaties are less liberal than formerly. This is a result which must be profoundly regetted, but the most deplorable of all is the rupture of the negociations with England—a fact, which we regard as more especially lamentable, in so far as the interests of French industry, in the narrower sense of the word are concerned.

By the previous commercial treaty England had, in fact agreed and had for the entire duration of the new treaty further engaged herself, to permit the importation of all French manufactured goods free of all duties. Considering the importance of the French export trade in manufactured goods to England—which has an annual value of about 4,000,000 frs. or 5,000,000 frs.—it will at once be seen how important it would have been to assure by treaty to this extensive trade the invaluable advantage of exemption from Customs duties during a further period of 10 years. With such a prospect those industries which are accustomed to send their productions to England, being certain of maintaining for the same important outlets during a long period of time, would be able to develope themselves and to make extensive improvements, the costs of which would be justified by the feeling of future security. No such feeling can, however, be said to exist at present. A precarious condition of affairs has taken the place of that secure feeling which would have been afforded by a new treaty of commerce with England, for we have nothing now to assure us that England will not impose more or less heavy duties upon the manufactures which we send her. It is evident that such an event would be a real disaster for some of the prominent branches of French industry, and that accordingly the industrial interests of this country, taken as a whole, must greatly regret that a new treaty with England has not been concluded. We do not (concludes the report of the Bordeaux Chamber) upon this occasion intend to undertake the sad task of investigating who may be responsible for the rupture of the negociations, and may refer all those who may be desirous of gaining information upon the subject to the diplomatic correspondence relating to this question. We can only express the hope that these negociations will be taken up again, and carried to a satisfactory end. The last commercial treaty with England was a source of immense benefit for the two nations, and a new treaty, if well framed, would have analogous effects from an economical point of view, without mentioning the political interests of a very high order connected with the same.

THE CAPELL FAN.—At the meeting of the South Staffordshire Institute of Mining Engineers at Dudley, on Monday (Mr. Henry Johnson, jun., in the chair), the discussion on the Capell fan was resumed by Mr. Treglown, stating that he was present at the experiments made at Messrs. R. Lloyd and Co.'s, Steelhouse-lane, Birmingham, the licensees, on Nov. 1. The results obtained from the fan were most surprising, and far exceeded what they had always been accustomed to get from fans in use. But there was some discrepancy in the water gauge, and it wanted explanation, otherwise the results obtained might be considerably altered. Mr. Sopwith also spoke of the high results obtained by the fan, and of its apparent superiority; but he mentioned the water gauge, and put the useful effects of the fan a little lower than Mr. Treglown. Mr. Parfield agreed with Mr. Sopwith. Mr. Glennine gave results of experiments which he saw, and these were higher than Mr. Treglown's; in fact, surprisingly high. Mr. Alexander Smith said the figures given would show that Mr. Capell was creating power, and he held that the only proper way was to try the fan in a mine. (Hear, hear.) Mr. S. Watkins, Mr. Farnworth, and Mr. Henry Johnson, sen., also took part in the discussion, and whilst admitting the startling results obtained, wished for further experiments to see if the averages and results were maintained. Mr. Capell agreed to submit to any and every experiment the Institute desired. Mr. Johnson suggested that the fan should receive the recommendation of the Institute as a body, but this was adjourned until after the experiments. Mr. Capell offered to lay down at any colliery a 5 ft. fan complete, with an engine ready to bolt down, for 150*l.* This would be guaranteed to give 20,000 feet of air. If it was not successful the fan would be taken away free of expense, but if it was successful the machine be kept. It was then agreed to seek such an opportunity for Mr. Capell to try the fan at a colliery, and a hearty vote of thanks was passed to that gentleman

Registration of New Companies.

The following joint-stock companies have been duly registered:—

CHOA SUGAR FACTORY COMPANY (Limited).—Capital 14,000*l.*, in shares of 50*l.* To carry on in the Island of St. Lucia the business of planters, manufacturers, and refiners of sugar. The subscribers (who take one share each) are—W. Gillespie, 23, Crutched Friars; F. Peter, 23, Crutched Friars; C. M. Gillespie, 23, Crutched Friars; D. Mackenzie, 6, Mincing-lane; E. Anderson, 6, Mincing-lane; R. Henderson, Ewell; W. Box, Hampstead.

THE RIVER THAMES VEHICLE, GOODS, AND PASSENGER NAVIGATION COMPANY (Limited).—Capital 250,000*l.*, in shares of 5*l.* A shipowner's business for the conveyance of passengers, horses, cattle, vehicles, coal, coke, minerals, &c. The subscribers (who take one share each) are—A. F. Bloxam, Isleworth; W. J. Schemshaw, 71, Fernhead-road; G. Lewis, Finsbury Park; H. Stephen, 33, Warwick-street; C. R. Crosby, 38, Poultry; J. G. Bryant, 27, Golden-square; T. W. Mills, 15, Bassett-street.

THE HIGHAM CREEK BRICK COMPANY (Limited).—Capital 5000*l.*, in shares of 1*l.* To acquire, take over, and carry on a brickmaking business established in the county of Kent. The subscribers (who take one share each) are—F. Pryce, Gravesend; C. E. Conder, Gravesend; D. Bartlett, Gravesend; F. G. Bartlett, Gravesend; S. Burbidge, 9, Blomfield-street; A. Gunn, 9, Blomfield-street; C. E. Mentinick, 100, Shaftesbury-road.

LONDON AND NEW MEXICO COMPANY (Limited).—Capital 1000*l.*, in shares of 1*l.* To acquire certain mineral and agricultural and smelting property known as the Superior Mine, and any other estates and mining rights in the United States or elsewhere, and to carry on the business of mining in all branches; working and smelting copper or other metals and minerals; buying or selling copper and other ore or bullion absolutely and on commission, and the general business of cultivators of the landed property of the company. The subscribers (who take one share each) are—T. Carmichael, Glasgow, gentleman; C. B. Palmer, Junior United Service Club, retired Lieut., R.N.; W. H. Sands, 1, Temple-gardens, barrister; H. T. van Lann, 172, Lancaster-road, commission agent; S. H. Palmer, Luddington House, merchant; T. J. Reeves, Kensington, merchant; H. Duncan, 38, Cornhill, merchant. The following make up the first board—Messrs. T. Carmichael, C. B. Palmer, W. H. Sands, H. T. van Lann, S. H. Palmer, and T. J. Reeves. The qualification is the holding of one or more shares.

THE LONDON ELECTRIC COMPANY (Limited).—Capital 10,000*l.*, in shares of 5*l.* The usual business of an electrician, chemical engineer, &c. The subscribers (who take one share each) are—A. Spencer, 54, Arundel-square; A. Rhodes, Herne Bay; H. Golbourne, 60, Richmond-road; T. H. Fitzgerald, Teddington; E. M. Turner, Forest Hill; F. M. Brockelbank, Lee; J. Spencer, Cookham.

MORETON COLLIERY COMPANY (Limited).—Capital 20,000*l.*, in shares of 50*l.* To purchase the Preesgweene Colliery, situated in the parish of St. Martin's, Salop, along with all the lands and mines, wagons, colliery plant, articles and things belonging to said colliery, subject to the rents, royalties, and other outgoings. To work, develope, and carry on the collieries, mines, mineral properties, and other concerns that may come into possession of the company. The subscribers (who take one share each) are—J. Japp, Liverpool, shipbroker; W. R Wareing, Ormskirk, reverend; R. Darlington, Wigan, solicitor; M. Ambrose, Liverpool, shipbroker; W. Brownlow, Chirk, colliery manager; E. Smith, Wigan, gentleman; T. Smith, Wigan, accountant. The first four subscribers shall constitute the board.

PILKINGTON AND COMPANY (Limited).—Capital 12,000*l.*, in shares of 10*l.* and 100*l.* To purchase and continue a business of ashphalte manufacturers, situated at 15, Fish-street Hill, London, E.C. The subscribers (who take one share each) are—J. B. Moreland, Blackheath; J. W. Battiscombe, 26, Basinghall-street; M. Williams, 15, Fish-street Hill; J. P. Williams, 15, Fish-street Hill; H. Williams, 15, Fish-street Hill; J. Small, 14, Walbrook; D. Roome, Peckham.

THE TOXTETH REAL PROPERTY AND INVESTMENT COMPANY (Limited).—Capital 100,000*l.*, in shares of 10*l.* The usual business of a land, building, and investment company. The subscribers (who take 50 shares each) are—H. Jones, Toxteth Park; T. Hughes, Toxteth Park; R. H. Bullen, Toxteth Park; T. Evans, Toxteth Park; H. Wainright, Liverpool; T. H. W. Walker, Toxteth Park; J. Ellis, Liverpool; G. Morton, Toxteth Park; E. Jones, Toxteth Park; T. Trevitt, Toxteth Park.

THE NATIONAL PROVINCIAL CAFE COMPANY (Limited).—Capital 50,000*l.*, in shares of 1*l.* To establish, maintain, and carry on refreshment houses and rooms to the exclusion of intoxicants, in Liverpool and elsewhere. The subscribers are—J. Pegram, Liverpool, 250; W. Tharme, Liverpool, 200; G. Guilliam, Liverpool, 200; W. Smedley, Liverpool, 200; H. S. Riley, Liverpool, 200; A. Guilliam, Liverpool, 200; J. Looney, Liverpool, 200.

SANTA RITA MINING COMPANY (Limited).—Capital 72,000*l.*, in shares of 100*l.* To purchase or otherwise acquire a mine containing silver, &c., which is situate near the town of Nieves, State of Zacatecas, and any other mines, mining rights, and minerals in the Republic of Mexico, and to carry on in all branches the businesses of miners, also of extractors, crushers, washers, smelters, or amalgamators of ores, metals, and minerals generally. The subscribers (who take one share each) are—W. Arbuthnot, 13, York Buildings, retired major, American Army; E. L. Dwyer, 13, York Buildings, M.E.; R. A. Powell, Ascot, vice-admiral; C. G. Migrue, 5, Austin Friars, esquire; P. J. Loonir, Alexandra Hotel, esquire; T. P. Powell, 49, Palace Gardens-terrace, major; E. T. Roberts, 34, George-street, engineer. The following will be the first directors:—Messrs. W. Arbuthnot, C. G. Migrue, T. P. Powell, and E. T. Roberts. Future directors will have to qualify in 10 shares each.

JOSEPH SHAW AND COMPANY (Limited).—Capital 75,000*l.*, in shares of 10*l.* To acquire and continue the business of woollen and felt body and hat manufacturers in Saddleworth, Yorkshire. The subscribers (who take one share each) are—J. Shaw, Saddleworth; J. B. Shaw, Saddleworth; E. Cox, 6, Castle-street; C. Hirst, jun., Huddersfield; J. Hollingsworth; G. H. Shaw, Saddleworth; W. Radcliffe, Micklehurst.

KONIAH SYNDICATE (Limited).—Capital 10,000*l.*, in shares of 10*l.* To form, bring out, and establish any companies for acquiring and working certain concessions granted by the Sultan for Asia Minor. The subscribers (who take one share each) are—A. R. Wilson, 72, Bethune-road; A. Minshall, Islington; J. K. Rowbotham, 9, New Broad-street; J. Rowe, 2 New London-street; G. W. Jaman, Rosherville; T. B. Williams, 68, Cornhill; W. D. Roberts, Selhurst.

THE WEST OF IRELAND STEAM TRAMWAYS COMPANY (Limited)—Capital 300,000*l.*, in shares of 10*l.* To construct, equip, maintain, and work tramways authorised by the Tramways (Ireland) Acts 1860, 1861, 1871, 1881, and the Act of 1883. The subscribers (who take one share each) are—H. Alcock, 123, Bishopsgate-street; G. R. Rogers, 5, Great Winchester-street; E. Fox, Millwall; F. Newton, 16, King William-street; A. Kitt, Lupus-street; J. Wilkinson, 15, Campden Grove; S. F. Porter, St. Margaret's; R. J. Jenkins, 16, King William-street.

THE WESTERN BUENOS AYRES LAND COMPANY (Limited).—Capital 300,000*l.*, in shares of 10*l.* To acquire a certain property in South America, and carry on a business in connection therewith. The subscribers (who take one share each) are—C. Rotter, Gipsy Hill; C. Erdman, Dulwich; M. Bauman, 43, Norfolk-terrace; H. Glanville, Croydon; E. C. Roe, 33, Oakley-street; R. L. J. Gilligan, 208, Camberwell-green; A. R. Worderman, 13, Princes-street.

THE ASTLEY MILL COMPANY, DUKINFIELD (Limited).—Capital 100,000*l.*, in shares of 5*l.* To acquire certain land for the purpose of erecting mills, sheds, &c., and carrying on a cotton spinning business. The subscribers (who take one share each) are—J. E. Lawler, Dukinfield; A. Broadbent, Dukenfield; G. E. Wild, Dukinfield; A. C. Boyd, Dukinfield; G. B. Richardson, Dukinfield; E. Crossley, Dukinfield; W. E. Hyde, Stalybridge.

THE PONTYPRIDD HOUSE PROPERTY AND INVESTMENT COMPANY (Limited).—Capital 20,000*l.*, in shares of 10*l.* The usual business of a local building society, &c. The subscribers are—H. Davies, Llantrisant, 10; H. S. Davies, Pontypridd, 10; M. Cule, Pontypridd, 10; T. Morgan, Pontypridd, 10; T. Williams, Pontypridd, 1; J. Morgan, Llantrisant, 10; J. Morgan, Pontypridd, 10.

CITY OF DORCHESTER INDUSTRIAL DWELLINGS COMPANY (Limited).—Capital 30,000*l.*, in shares of 5*l.* The construction or improvement of dwellings for the labouring classes. The subscribers are—T. Lake, Rochester, 31; J. V. Bell, Rochester, 1; F. V. Belsey, Rochester, 1; J. S. Burton, Rochester, 1; H. Jasper, Cheetham, 1; G. E. Yelf, Rochester, 1; L. Yelf, Rochester, 1; G. E. Penke, Rochester, 1; G. Winch, Chatham, 1.

STEEL AND ALLOYS OF IRON AND STEEL.

Heretofore many attempts have been made to produce steel castings, but the result has generally been a failure, not only for the reason that steel of a good grade cannot be melted and poured into moulds and produce castings with sharply defined angles corresponding with the angles of the moulds, but also the quality of the steel itself after it has been melted and poured into moulds becomes greatly deteriorated. Furthermore, on account of the difficulty of melting and pouring steel of a good grade, a poor grade of steel has generally been selected for this purpose, because the latter will melt and pour more readily than the former. Steel, even of the best quality, if melted in conjunction with charcoal pig-iron, as hereinafter explained, will form a mixture which is sufficiently fluid to be run into and take the exact form of the mould, while the quality of the steel will not be impaired, but it will remain applicable even (say) to cutting tools. The invention of Mr. G. W. FRANCIS, of Middlesex, U.S., consists in melting steel which is rich enough in carbon to be hardened and tempered in conjunction with charcoal pig-iron, pouring such fluid or molten mixture into any desired form of moulds and then annealing the metal so cast. It also includes the peculiar composition of metal or material which is the product of said process.

To carry the invention into effect, Mr. Francis takes scrap tool steel, such as old files and old dies and Lake Superior charcoal pig-iron, or other charcoal iron of the like character, and preferably places the iron into the bottom of a crucible and the steel on the top, the same being in proportions varying from three parts of the steel and one of iron to one part of the steel and four of the iron, according to the quality of steel castings to be produced, the smallest amount of iron with the largest amount of steel producing the best steel for most purposes; but these proportions may be somewhat varied, especially a larger proportion of the iron can be added when the use for which the casting is designed will admit. The castings thus produced are annealed, after which they are ready for use. Prior to annealing, the metal cannot be rolled or hammered with good results when either cold or hot. It has been found that three parts of steel and one of charcoal pig-iron thus placed in a crucible, even when the best refined steel is used, will readily melt at a white heat, the iron first melting and the steel melting immediately or soon thereafter, and falling down into the crucible with the iron and comingles therewith, forming a molten metal which may be readily poured into ordinary sand moulds. It is also found that this compound runs very freely, so as to produce sharp and well-defined castings even of a very small size, which are free from flaws or blow-holes, are of a fine and homogeneous structure, and which, after annealing, may be refined by rolling or hammering while hot, and may be hammered for any purpose when cold.

When finely polished this new steel closely resembles nickel, and is very free from all tendency to oxidise. Said castings, unless a larger proportion of iron is employed than that hereinbefore specifically stated, are also capable of being hardened and tempered by merely heating and immediately immersing in water or other liquid in the same manner as other steel. It is preferable to use scrap steel composed of old tools, &c., because such steel is generally of a superior quality, and can be obtained cheaply, but bar steel or other steel which can be hardened and tempered may be used if desired with good effect. This steel may be produced not only in crucibles, but furnaces may also be employed for this purpose. In carrying out the said process no manganese or anything else is put into the crucible except the steel and iron before mentioned, and into the furnace except fuel.

If desired, instead of first pouring it into moulds for shaping it into its final form, the steel or compound may first be run into ingot moulds, and the ingots thus produced may be re-melted and run into moulds for shaping the desired article or articles. For edge tools, such as axes, chisels, &c., it is preferable to cast the article into substantially the desired form, and afterwards the cutting blade of such edge tools may be heated and hammered to refine and toughen them, after which they are hardened and tempered in the ordinary manner. Bessemer steel and common cast-iron have been heretofore melted and puddled; but this forms no part of Mr. Francis's invention. He also remarks that it has been tried to melt steel in conjunction with various kinds of iron, but nothing except charcoal pig-iron has been found which can be mixed with steel for casting and producing the results which he obtains.

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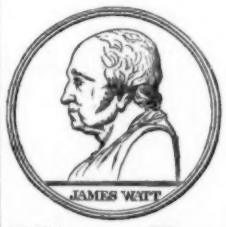


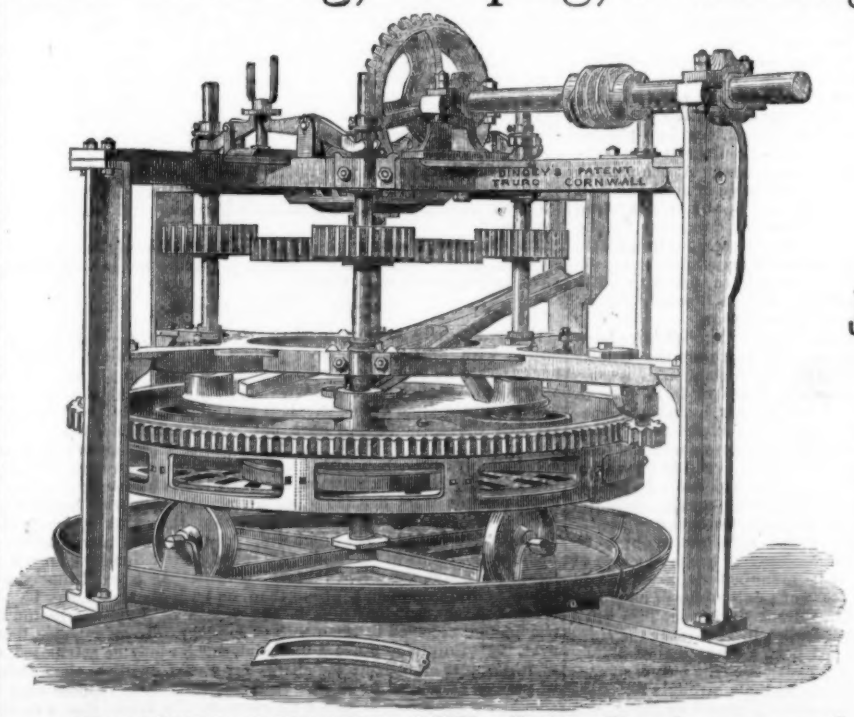
ESTABLISHED A CENTURY.

ROYAL CORNWALL POLYTECHNIC SILVER MEDAL.
MINING INSTITUTE FIRST CLASS.
"MINING JOURNAL" £20 SPECIAL PREMIUM.

FRANCIS DINGEY AND SON,

INVENTORS AND PATENTEES OF IMPROVED

Mine Dressing, Pumping, & Winding Machinery,



WATER WHEELS,

Ore Crushers,

PULVERISERS,

Jiggers, Buddles, &c.,

MILLWRIGHTS' AND ASSAYERS' REQUISITES.

Combining all the latest improvements, which they have made their study for many years.

MINES SURVEYED for Machinery, and Plans and Estimates submitted on application to

FRANCIS DINGEY AND SON, Engineers and Ironfounders
"Truro Foundry," Truro, Cornwall.

BELL'S ASBESTOS.

BELL'S PATENT ASBESTOS BLOCK PACKING, for Marine and Pumping Engines. This packing has been specially designed to overcome the difficulties experienced by marine engineers and others in the practical working of engines of the most modern type of construction. The greatly increased skill and workmanship now obtained in the construction of engines and boilers have led to a rapid increase in the working pressure, the object being the attainment of a high rate of speed combined with economical working, the practical advantage of which, however, cannot be realised unless the Packings are so constructed as to avoid stoppages at sea for the purpose of re-packing the stuffing boxes.

It is now a recognised fact that the most perfect heat-resisting material suitable for the purpose of a Packing is Asbestos, but to ensure a successful application of this fibre, great skill is required in its selection and manufacture. In this Packing the Asbestos is woven into a stout cloth, and owing to the peculiar way in which it is manipulated, great elasticity is imparted to the Packing. So successfully has this been done, that with light screwing, it has been found in practice that little or no lubricant is required to ensure a minimum amount of friction, and to keep the rods from over-heating. An improved vacuum is always maintained by the use of this packing, which meets with unqualified approval wherever it is applied.

This packing is made in four forms to meet various requirements, viz., as Fig. 1, square; 2, round with solid rubber core; 3, with tubular rubber core; 4, without core, but with rubber inlaid.

As these packings are extensively imitated, and as it is a common practice among dealers and agents to supply the cheaper manufactures at my list prices, users are requested to see that the packing supplied to them bears my trade mark.

BELL'S PURE ASBESTOS PLAITED YARN PACKING. This is the best and most economical Piston Packing in the market for High and Low Pressure Stationary Engines. Of course there are many imitations of a Packing so universally approved of, but I am the Original and Sole Manufacturer of the genuine article.

Every 10 ft. length of this Packing bears a label with my Trade Mark, and users are recommended to see that this label is attached, to secure their obtaining the material they have ordered.

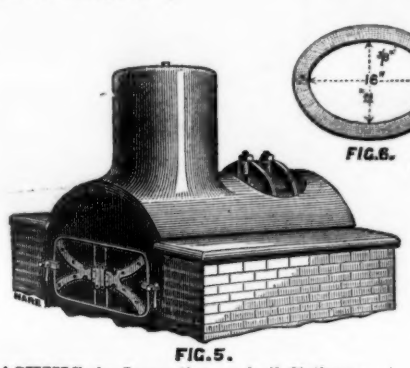


FIG. 5.

FIG. 6.

FIG. 1.

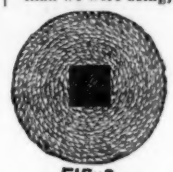


FIG. 2.

FIG. 4.

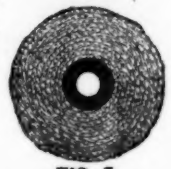


FIG. 3.

BELL'S ASBESTOS YARN and SOAPSTONE PACKING for Locomotives, and all Stationary Engines running at a very high speed with intense friction.

The following Testimonial refers to this packing;—

Festiniog Railway, Locomotive Superintendent's Office, Portmadoc, January 13th, 1883.

Mr. John Bell, 113, Southwark-street, S.E.

DEAR SIR,—I have much pleasure in saying that the Asbestos Yarn and Soapstone Packing gives every satisfaction; indeed better than we expected. We have a locomotive packed with it, which has been running five months (and think of the piston speed with our small wheels). I think the Soapstone a great improvement, as it keeps the packing elastic, and prevents it getting hard. I am very pleased with its working, and also the very low price for such good lasting packing. The Asbestos Yarn we find is very useful, and answers admirably.

Yours truly, (Signed) W. WILLIAMS.

Every 10 ft. length of Bell's Asbestos Yarn and Soapstone Packing bears a special label with the Trade Mark, and engineers are earnestly requested to see that this label is attached, to prevent imposition by worthless imitations.

BELL'S ASBESTOS BOILER COVERING COMPOSITION (Fig. 5), for Coating the Pipes and Boilers of every kind of Marine and Stationary Engine. Non-combustible, and easily applied when steam is up; adheres to metals and preserves them from rust; prevents the unequal expansion and contraction of boilers exposed to weather; covers 50 per cent. more surface than any other coating, and is the most durable material of its class.

The composition is supplied dry, and is only to be mixed with water to the consistency required for use.

The following Testimonial refers to the Asbestos Boiler Covering Composition;—

The Maxim-Weston Electric Company (Limited), 29, Bankside, London, S.E., Jan. 4th, 1883.

Mr. John Bell, 113, Southwark Street, S.E.

DEAR SIR,—In answer to your request, I beg to inform you that I find the thermometer placed 3 ft. above the boilers now stands at 93°; before your covering was put on it used to stand at 126°. With regard to the saving of fuel, I am unable to speak very accurately, as the boilers were not working long enough before being covered to ascertain the amount of fuel that would be consumed in an ordinary run; but I feel quite justified in saying that we burn less by about 5 cwts. per night than we were doing, and I shall be glad at any time to show the boilers to anyone who may wish to see them, as I consider yours the best covering that I have up to the present seen.

Yours faithfully,

(Signed) J. H. CUNDALL, Works Manager.

BELL'S ASBESTOS and INDIA-RUBBER WOVEN TAPE and SHEETING, for making every class of Steam and Water Joints. It is the most efficient material for making bilge water pipe joints. It can be bent by hand to the form required without puckering, and is especially useful in making joints of manhole and mudhole doors; also for large "still" joints where boiling fat and steam have to be resisted. It is kept in stock in rolls of 100 ft., from ⅛ in. (Fig. 6) to 3 in. wide, and any thickness from 1/16 in. upwards. Manhole covers can be lifted many times before the renewal of the jointing material is necessary.

The same material is made up into sheets about 40 in. square, and each sheet bears my Trade Mark, without which none is genuine.

The engineer of a world-renowned firm writes:—"There is not, nor can there be, any doubt as to the excellence of your Asbestos and Indiarubber Woven Sheeting—as a jointing material it is unrivalled."

The engineer of a large colliery writes:—"I would in all candour say that your Asbestos and Indiarubber Woven Sheeting is first-rate for joints. In my 25 years' experience I have not seen anything like it. I highly recommend it to all those who have to do with steam engines."

It is very necessary to guard against imitations of this useful material, and to secure themselves against being supplied with these cheaper articles at my price, users are recommended to see that every 10 ft. length of the Asbestos Tape purchased by them bears my Trade Mark.

BELL'S SPECIAL LONDON-MADE ASBESTOS MILLBOARD, for Dry Steam Joints, made of the best Asbestos fibre, is well-known for its toughness and purity, and is absolutely free from the injurious ingredients frequently used to attain an appearance of finish, regardless of the real utility of the material. Made in sheets measuring about 40 in. square, from 1-64th in. to 1 in., and ½ millimetre to 25 millimetres thick. Each sheet bears my Trade Mark.

To avoid spurious imitations, and to secure the receipt of genuine goods, all orders should be sent direct to the undermentioned addresses, and not through Agents or Factors.

ILLUSTRATED PRICED CATALOGUE FREE ON APPLICATION TO

BELL'S ASBESTOS WORKS, SOUTHWARK, LONDON, S. E.

OR THE BRANCH WAREHOUSES—

VICTORIA BUILDINGS, DEANSGATE, MANCHESTER. 11 AND 13, ST. VINCENT PLACE, GLASGOW. 21, RITTER STRASSE, BERLIN.

ESTABLISHED 1852.

SYBRY, SEARLS, AND CO.,

MANUFACTURERS OF THE

CELEBRATED MINING STEEL, BRANDED SSS

Cast Steel, Shear, Blister, Spring, Hammer, and Pick Steel.

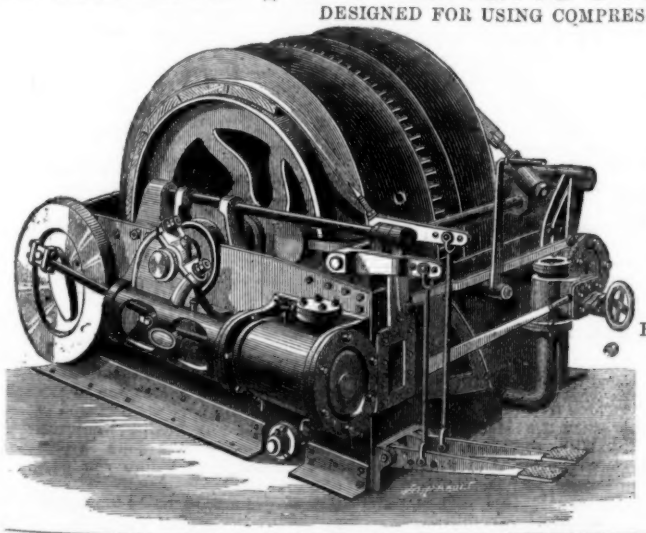
Special Rock Drill Steel.

Mining Tools, Files, Saws, Hammers, and Picks.

CANNON STEEL WORKS, SHEFFIELD.

STEVENS' PATENT UNDERGROUND WINDING ENGINE,

DESIGNED FOR USING COMPRESSED AIR OR STEAM.



SIMPLE, COMPACT, PORTABLE.

Silver Medal, Royal Cornwall Polytechnic Society, 1876.

No. 1 size, 7 in. single cylinder, with 2 ft. drums.
No. 2 size, 9 in. single cylinder, 2 ft. 6 in. drums.
A,— 6 in. double cylinder, with 2 ft. 3 in. drums
B,— 8 in. " " 3 ft. 0 in. drums.
C,—10 in. " " 3 ft. 6 in. drums.
D,—12 in. " " 4 ft. 6 in. drums.
E,—14 in. " " 5 ft. 0 in. drums.

MANUFACTURED BY

THE USKSIDE CO.,

ENGINEERS, MAKERS OF PUMPING AND WINDING MACHINERY, AND FORGINGS OF EVERY DESCRIPTION.

NEWPORT, MON.

Agents for the six Northern Counties—
TANGYE BROTHERS, ST. NICHOLAS BUILDINGS NEWCASTLE-ON-TYNE.

This Advertisement appears fortnightly.]

MANCHESTER WIRE WORKS.

NEAR VICTORIA STATION, MANCHESTER.

(ESTABLISHED 1790).

JOHN STANIAR AND CO.,

Manufacturers by STEAM POWER of all kinds of Wire Web, EXTRA TREBLE STRONG for

LEAD AND COPPER MINES.

Jigger Bottoms and Cylinder Covers woven ANY WIDTH, in Iron, Steel, Brass, or Copper.

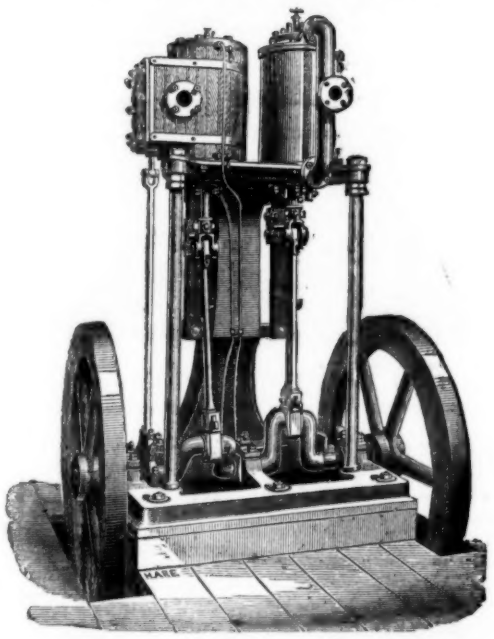
EXTRA STRONG PERFORATED ZINC AND COPPER RIDDLES AND SIEVES.

PERFORATED IRON, STEEL, COPPER, AND ZINC PLATES IN VARIOUS DIMENSIONS AND THICKNESSES.

Shipping Orders Executed with the Greatest Dispatch

THE

"Champion" Rock-borer AND AIR COMPRESSOR.



The work performed by this machinery, through some of the hardest rock, proves its great value.

In Cornwall, irrespective of the work done by the "Champion" Rock-borers purchased by various Mines, the drivage, rising, stoping, and sinking on the proprietor's own contract work, amounts to over 1070 fathoms.

The wood-cut represents one of these Air-Compressors. Four of them, of three different sizes, can be seen, at work, in about an hour's walk through the Camborne Mining District.

R. H. HARRIS,

ENGINEER,

63, QUEEN VICTORIA STREET, LONDON.

FROISETH'S NEW AND REVISED MAP FOR 1875,—Size 40 by 56 inches, scale 8 miles to the inch. Handsomely engraved, coloured in counties, showing the Towns, Settlements, Rivers, Lakes, Railroads Mining Districts, &c., throughout the Territory, and all the Government Surveys to date. Mounted on cloth, £2; half-mounted, £1 12s.; pocket form, £1.

Also, GENERAL MINING MAP OF UTAH, showing twenty-eight of the principal Mining Districts adjacent to Salt Lake City, and location of the most prominent mines. Price, pocket form, 8s.

Also, NEW MAP OF LITTLE AND BIG COTTONWOOD MINING DISTRICTS showing the location of over Four Hundred Mines and Tunnel Sites, together with the Mines Surveyed for United States Patent. Price, sheets, 6s.; pocket form, 8s.

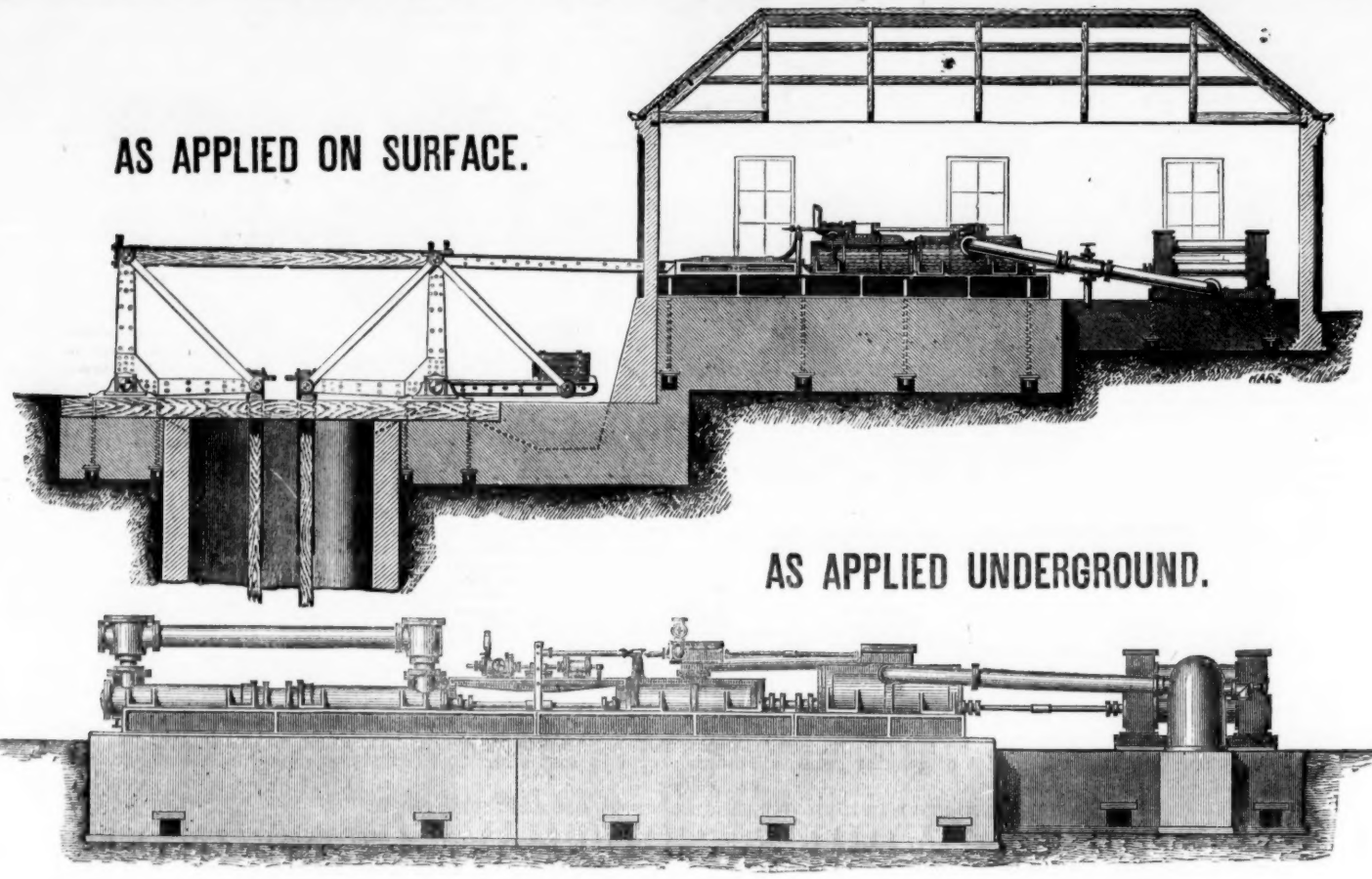
For sale, and supplied by—
TRUBNER and Co., 57 and 59 Ludgate Hill, London.
B. A. M. FROISETH, Salt Lake City, Utah, U.S.

MONEY LENT, at EIGHT, NINE, and TEN PER CENT., on FIRST MORTGAGE of FREEHOLDS for IMPROVEMENTS and STOCKING, said freeholds in the Province of MANITOBA.

Address, HERBERT C. JONES, Solicitor, 20, Masonic Hall, Toronto.

HATHORN, DAVEY AND CO., LEEDS.

THE DIFFERENTIAL PUMPING ENGINE.

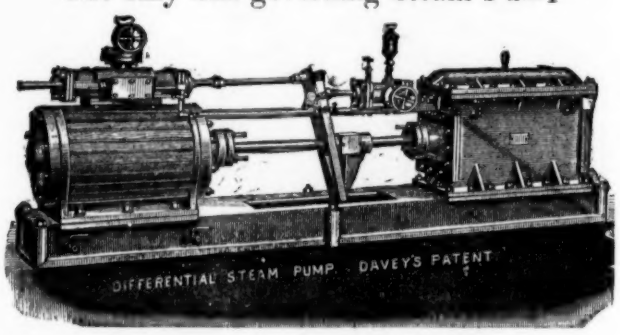


MINING MACHINERY OF ALL KINDS.

Hydraulic Pumping Engines and Hydraulic Machinery of all kinds.

THE DIFFERENTIAL STEAM PUMP.

The only Self-governing Steam Pump.



See Reduced Price List.

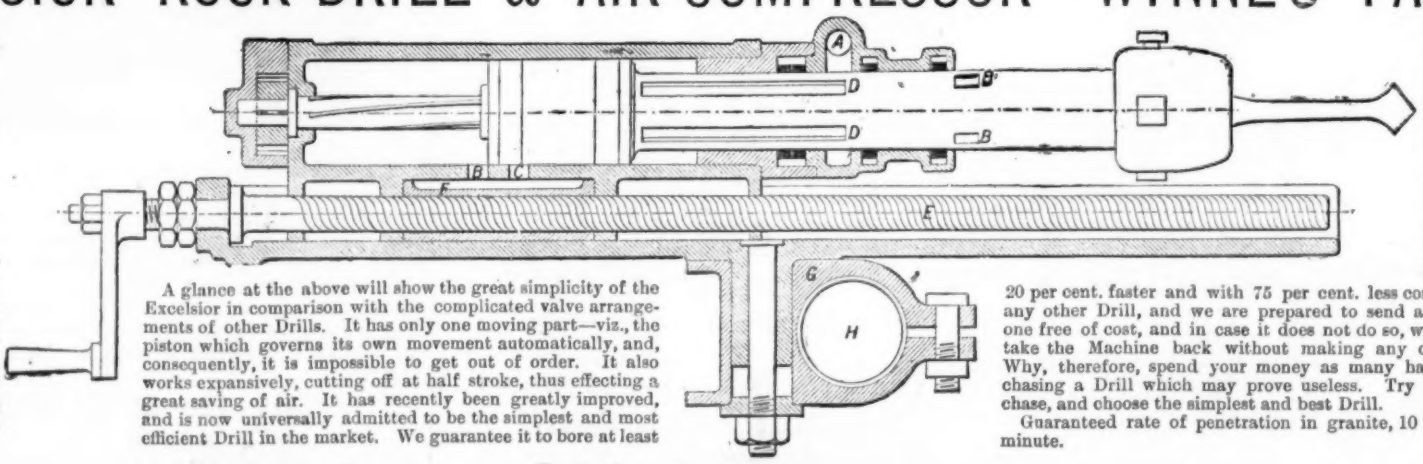
PRICE LIST.

Diameter of Steam Cylinder. Inches.	Diameter of Water Cylinder. Inches.	Length of stroke. Inches.	Gallons per Hour.	Height to which water can be raised with 40 lbs. steam pressure. Feet.	PRICE. £	Price with Condenser, in Suction Pipe. £	Price with Air Pump Condenser. £	Diameter of Suction and Delivery Pipes. Inches.	Diameter of Steam Pipe. Inches.	Diameter of Exhaust Pipe. Inches.
10	5	15	5,200	250	65	72	85	5 3/4	1 1/2	2 1/2
10	7	15	10,400	130	70	80	100	6	1 1/2	2 1/2
10	9	15	17,300	70	85	100	120	4 1/2	1 1/2	2 1/2
12	6	24	6,500	250	90	104	130	5 1/2	2	2 1/2
12	7	24	10,560	180	96	110	136	6	2	2 1/2
12	8	24	13,500	140	100	114	142	7	2	2 1/2
12	10	24	21,300	90	120	136	175	5 1/2	2	2 1/2
14	7	24	10,400	250	110	130	156	6 1/2	2 1/2	3
14	8	24	13,500	190	120	145	165	6	2 1/2	3
14	9	24	17,300	150	130	150	172	6 1/2	2 1/2	3
14	10	24	21,300	120	140	162	190	7 1/2	2 1/2	3
14	12	24	30,800	80	160	190	216	9	2 1/2	3
16	8	24	13,700	250	140	170	195	6	3	3 1/2
16	9	24	17,300	200	150	180	215	6 1/2	3	3 1/2
16	10	24	21,300	160	160	196	225	7 1/2	3	3 1/2
16	12	24	30,800	110	180	220	246	9	3	3 1/2
16	14	24	42,000	80	200	242	264	10 1/2	3	3 1/2

EXCELSIOR ROCK-DRILL & AIR-COMPRESSOR—WYNNE'S PATENT.

AWARDED
MEDAL
OF THE
ROYAL
CORNWALL
POLYTECHNIC
SOCIETY,
1883,
FOR
PRINCIPLE
OF
CONSTRUCTION

Prices, with all the latest improvements:—
3 in. diam...£38
3½ in. diam... 42
4 in. diam... 52



A glance at the above will show the great simplicity of the Excelsior in comparison with the complicated valve arrangements of other Drills. It has only one moving part—viz., the piston which governs its own movement automatically, and, consequently, it is impossible to get out of order. It also works expansively, cutting off at half stroke, thus effecting a great saving of air. It has recently been greatly improved, and is now universally admitted to be the simplest and most efficient Drill in the market. We guarantee it to bore at least 20 per cent. faster and with 75 per cent. less cost in repairs than any other Drill, and we are prepared to send a Machine to any one free of cost, and in case it does not do so, we are prepared to take the Machine back without making any charge whatever. Why, therefore, spend your money as many have done in purchasing a Drill which may prove useless. Try before you purchase, and choose the simplest and best Drill.

Guaranteed rate of penetration in granite, 10 to 14 inches per minute.

It is the SIMPLEST, STRONGEST, LIGHTEST, CHEAPEST, MOST EFFICIENT, MOST DURABLE.

For further particulars, apply to—

THE EXCELSIOR ROCK-DRILL COMPANY, WREXHAM.

Price One Shilling.

THE MINERAL RESOURCES OF NEW ZEALAND
By H. BRAMALL, M.Inst.C.E., Mining Engineer.
London: HAMILTON, ADAMS, and Co.

THE COLLIERY READY-RECKONER AND WAGES CALCULATOR.
By JAMES IRELAND
"Will be the means of preventing many disputes between pay clerks and colliers."—*Mining Journal.*
To be had on application at the MINING JOURNAL Office, 26, Fleet-street, E.C

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SILVER MEDAL (HIGHEST AWARD) MELBOURNE, 1881.

JOHN SPENCER,
Globe Tube Works, WEDNESBURY,
AND 3, QUEEN STREET PLACE, CANNON STREET, LONDON, E.C.
FIRST PRIZE, SYDNEY, 1880.
TUBES AND FITTINGS for Gas, Steam, and Water; Galvanised, Enamelled, and Hydraulic Tubes; Boiler Tubes and Fittings; Gas Fitters' Tools; Brass Cocks, &c.
ANTI-CORRODO TUBES AND FITTINGS COATED BY BARFF'S RUSTLESS PROCESS.

MELBOURNE EXHIBITION.

GOLD AND SILVER MEDAL AWARDED for
Steam-Engines and Boilers, Winding Engines,
the Special Steam Pump, &c.

TANGYES LIMITED,

CORNWALL WORKS, BIRMINGHAM.

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NEWCASTLE:
TANGYE BROTHERS ST NICHOLAS BUILDINGS

MANCHESTER:
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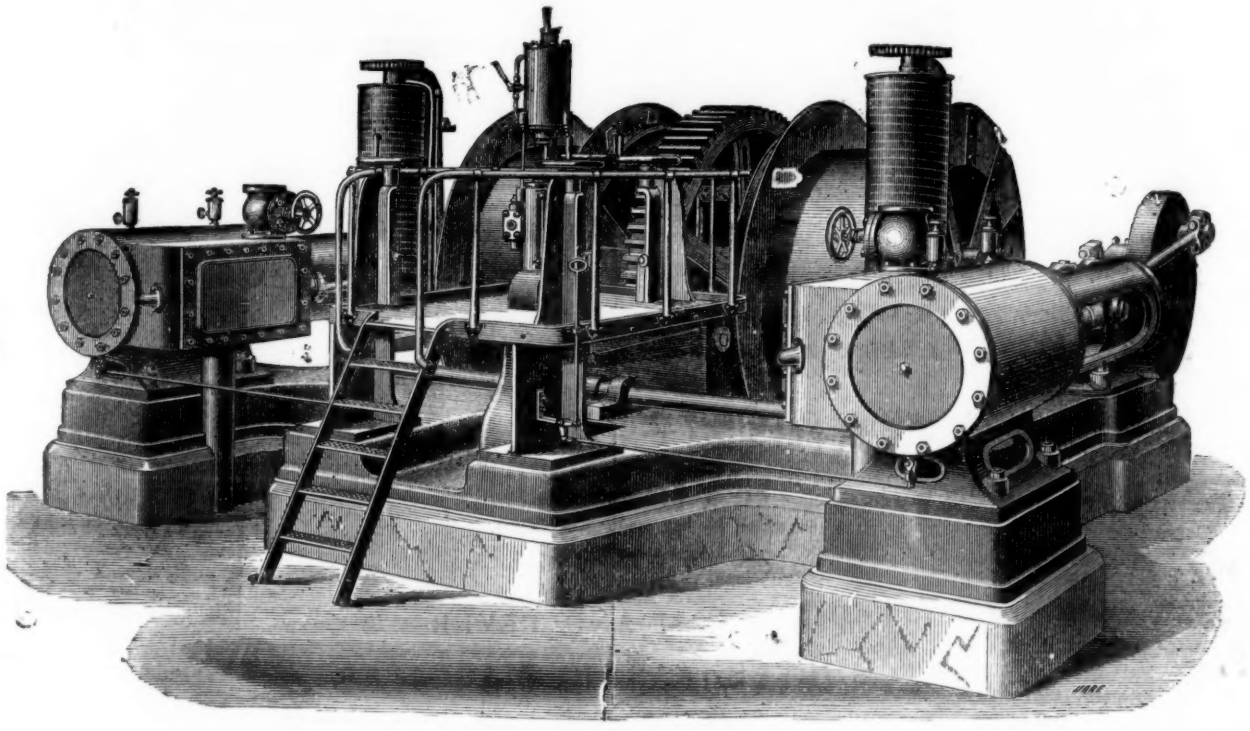
GLASGOW:
TANGYE BROTHERS ARGYLE STREET

TANGYE'S IMPROVED

HAULING & WINDING ENGINE,

WITH STEAM REVERSING GEAR.

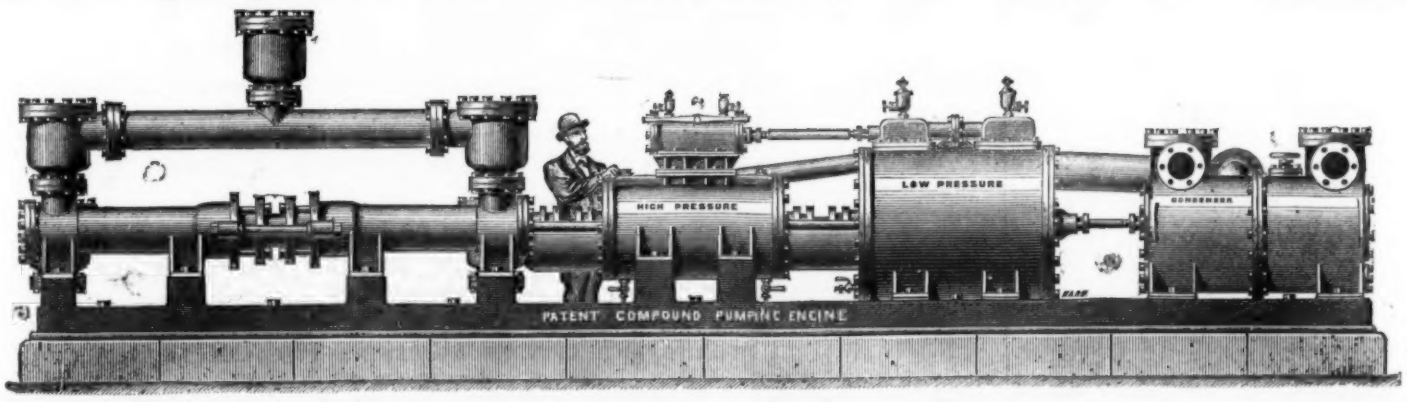


TANGYE'S DIRECT-ACTING

COMPOUND PUMPING ENGINE

For use in Mines, Water Works, Sewage Works,

And all purposes where Economy of Fuel is essential.



SUCCESSFULLY WORKING at the NEWCASTLE and GATESHEAD WATERWORKS, the ADELAIDE, CHESTERFIELD and BOYTHORPE, WYKEN, and other COLLIERIES.

CATALOGUES FORWARDED ON APPLICATION.

PARIS EXHIBITION, 1878. GAINED THE GRAND PRIZE. THE TRIPLE AWARD. Gold Medal, Silver Medal, and Honourable Mention in competition with all the World.

THE BLAKE-MARSDEN NEW PATENT IMPROVED STONE BREAKERS AND ORE CRUSHERS.

ORIGINAL PATENTEE AND ONLY MAKER.

H. R. MARSDEN,

ALSO PATENTEE AND ONLY MAKER OF THE

NEW PATENT FINE CRUSHER OR PULVERIZER,

FOR REDUCING TO AN IMPALPABLE POWDER, OR ANY DEGREE OF FINENESS REQUIRED,

GOLD QUARTZ, SILVER, COPPER, TIN, ZINC, LEAD,

AND ORES OF EVERY DESCRIPTION;

Also Cement, Barytes, Limestone, Chalk, Pyrites, Coprolite, &c., &c. These Machines are in successful operation in this country and abroad, and reference to users can be had on application.

PATENT REVERSIBLE CUBING and CRUSHING JAWS, IN FOUR SECTIONS, WITH PATENT FACED BACKS, REQUIRING NO WHITE METAL IN FIXING.

NEW PATENT CRUCIBLE CAST-STEEL CONNECTING RODS.

NEW PATENT RENEWABLE TOGGLE CUSHIONS, &c.

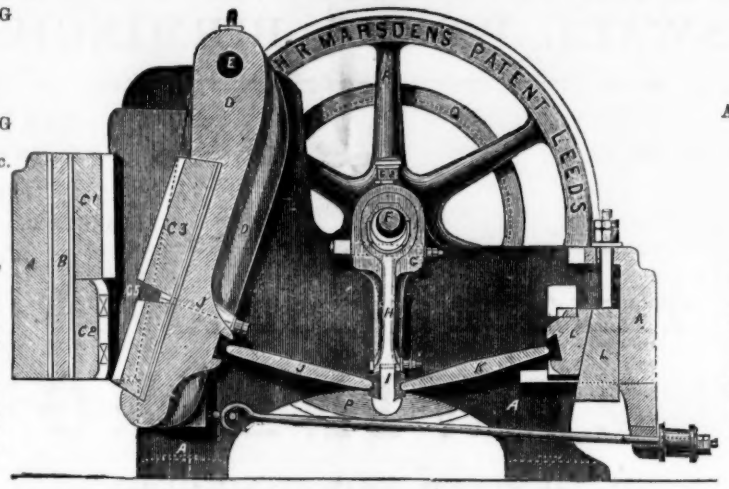
OVER **4000** IN USE.

EXTRACT FROM TESTIMONIALS.
PULVERIZER.

"I have great pleasure in bearing testimony to the merits and capabilities of your patent combined fine crusher and sieving apparatus. I have tried it on a variety of ores and minerals, and it pulverizes them with equal success. You can put in a small paving stone and bring it out like flour."

"The power required to drive it is very small, being from 4 to 5-horse, and the repairs are almost nil."

"I am sure the machine will be a success, and a great one, and there is any amount of demand for such a machine. We can work it with 20 lbs. of steam, and our engine, which is a 12-h.p., plays with the work, in fact we run the Stonebreaker and the Pulverizer both together with 35 lbs."



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FIRST-CLASS GOLD AND SILVER MEDALS.

ADOPTED BY THE PRINCIPAL CORPORATIONS, CONTRACTORS, MINING COMPANIES, &c., IN ALL PARTS OF THE WORLD.

ROAD METAL BROKEN EQUAL TO HAND, AT ONE-TENTH THE COST.

EXTRACTS FROM TESTIMONIALS.
STONEBREAKER.

"The 15 × 8 stonebreaker gives perfect satisfaction. It produces a more cubical stone than any others I have seen at work."

"Your 15 × 10 machine makes the best road metal I have ever seen put through a machine—in fact, comparing favourably with hand-broken."

"Your 10 × 7 crusher at the Aruba Gold Mines will crush 90 to 100 tons per 24 hours of the hardest gold quartz to 1 'size.'"

"Some of your testimonials do not give your machines half their due. I have seen men hammering away on a big rock for a quarter of a day which your machine would reduce to the required size in a quarter of a minute. I would guarantee that your largest size machine would reduce more of the Cornish tin capels (which is the hardest rock of England) in a day than 200 men, and at 1-25th the cost."

GREATLY REDUCED PRICES ON APPLICATION.

FOR CATALOGUES, TESTIMONIALS, &c., APPLY TO THE SOLE MAKER,

H. R. MARSDEN, SOHO FOUNDRY, LEEDS.

JOHN CAMERON'S

SPECIALITIES ARE HIS

STEAM PUMPS

FOR

COLLIERY PURPOSES.

Specially adapted for forcing Water any height

ALSO, FOR

SINKING, FEEDING BOILERS AND STEAM FIRE ENGINES,

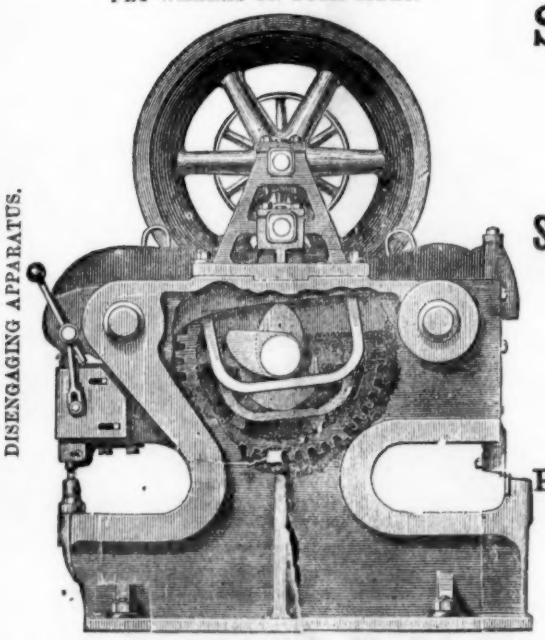
which he has made over 8000.

ALSO, HIS

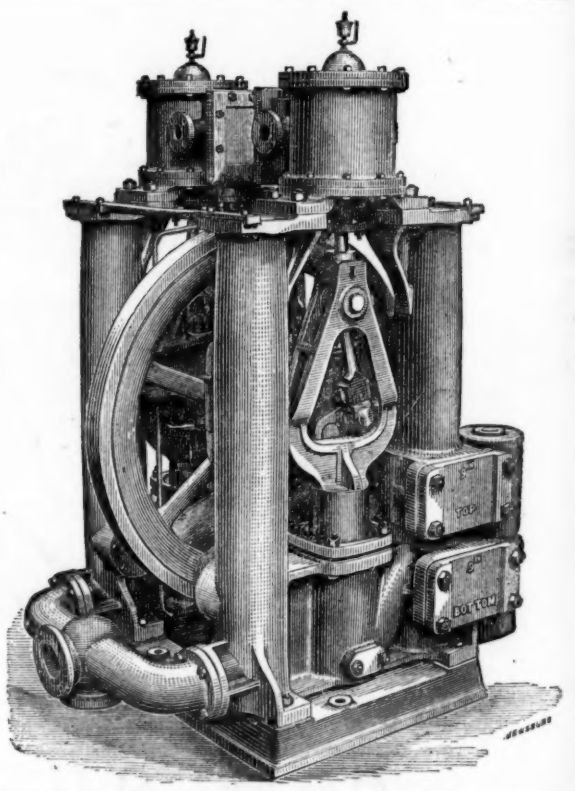
PATENT CAM AND LEVER PUNCHING AND SHEARING MACHINES.

Works: Oldfield Road, Salford, Manchester.

FLY-WHEELS ON BOTH SIDES.



DISENGAGING APPARATUS.



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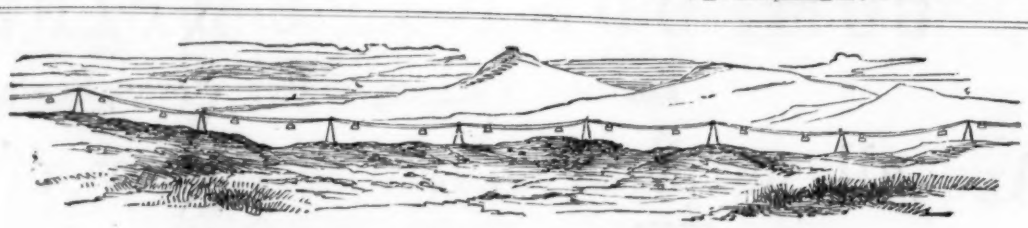

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